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Salary Increase for Senior Staff

SALARY increases ranging from £45 to £65 a year have been awarded to about 3,000 officers and senior clerical and supervisory staff of British Railways as recorded elsewhere in this issue. As these apply to salaries, before augmentation, of between some £800 and £1,750 a year, the proportionate increase in most cases is considerably lower than the 6s. a week received by the half-million or so wage and lower salaried grades whose pay was raised as from early December. This last was agreed after negotiations between the British Transport Commission and the three railway unions, one of which, the National Union of Railwaymen, had threatened to strike. The salary increase now announced for officers and senior staff has been negotiated between the Commission and the British Transport Officers' Guild and the Transport Salaried Staffs' Association, and is back-dated to February. It is felt by a good many railwaymen, and not only those affected by the new award, that men performing responsible work should receive greater recognition of their special responsibilities than seems to have been accorded to the senior staff concerned, and that any augmentation of salary received by them should be at

least as much proportionately as that awarded to their juniors or subordinates. The reason for the railway pay increases in December, however, was the rise in the cost of living, and presumably the award to senior staff has been agreed on the same basis. Many junior officers and senior clerical and supervisory staff would not agree that what has been awarded to them covers the rise in the cost of living; some would claim that they depend on merit increases or promotion to offset this rise. Apart from the soundness or otherwise of their case as to the cost of living, much can be said for recognising responsibility, and especially that of the junior officer on whom so much depends. Now that the whole structure of railway pay is under discussion between the Commission and the unions, with special reference to differentials for skill in the wage grades, the question of recognising officers' and senior staff pay no doubt is receiving careful attention.

Increasing Efficiency on British Railways

THE determination of British Railways to meet as much of the rising cost of salaries, wages, and other items as may be possible by internal effort rather than increased charges to consumers is reflected in the measures to increase efficiency which were the subject of editorial comment in our April 23 issue. Arrangements are being made to exchange ideas and experience between Regions as the drive progresses. Writing in the May issue of the *British Railways Magazine* "The Man on the Line" points out that unless the railways do their share in meeting the higher bill by increased productivity in all phases of work they run the risk of pricing themselves right out of business. An honest self-examination, he suggests, would result in an admission by most railwaymen that they are conscious of ways in which time and effort could be better used by their colleagues and themselves. This implies, not that the railways are inefficient now, but that with railways, as with other industries, there is a need for men to think about their work and suggest methods which will result in faster, better, and cheaper production.

Institution of Locomotive Engineers Summer Meeting

THE summer meeting of the Institution of Locomotive Engineers, an account of which is given elsewhere in this issue, was held on May 13-14, and consisted of visits to the Crewe Locomotive Works of the London Midland Region, and the Hawarden Bridge Steelworks of John Summers & Sons Ltd. Members and their guests were taken on a conducted tour of Crewe Works, to study much of the belt system installed for the repair of locomotives and boilers, and the building of various types of British Railways standard steam locomotives. At Hawarden Bridge Steelworks they could see the production of steel sheet from the receipt of the raw material through all its phases to the finished products. During the visit the members were entertained to lunch by the Chairman and Directors of John Summers & Sons Ltd., when Mr. R. C. Bond, President of the Institution, was able to express the appreciation of members of the excellent arrangements made by their hosts.

Electrification in East Africa

A REPORT was published last week in *The Financial Times* from its special correspondent in Uganda, that preliminary discussions at a high level were understood to be in progress on the possibility of electrifying the East African Railways. The power, it was suggested, would be hydro-electric, and any electrification would be on the overhead system, and would moreover make the railways independent of imported oil fuel. It was further suggested that Mr. A. F. Kirby, General Manager of East African Railways & Harbours, would fly to London to discuss the problem. Inquiries in this country have failed to substantiate the suggestion. The recent inauguration by the Queen of the Owen Falls scheme in Uganda has given prominence to the question of hydro-electric power in East Africa. The completion of the dam is stated in some quarters to have

outstripped the development of the industry it is designed to serve, and if that were the case railway electrification would go far to solve any problem of absorbing surplus power.

An Unlikely Possibility

SUGGESTIONS for electrification of railways in the locality, however, often accompany developments in any hydro-electric power supply. The high initial cost of electrification, the statement in the E.A.R. & H. report for 1952 that local circumstances were not favourable to main-line electric traction, low traffic density, the extensive orders for steam motive power from British builders, and the operating economies achieved with Beyer-Garratt and other steam locomotives already delivered seem to make electrification a remote possibility. On the other hand, it would be unwise to scout it. There have been developments in 50-cycle traction on lightly trafficked railways, notably in the Belgian Congo, where, however, conditions differ materially from those on the East African Railways. Mr. Kirby has come to this country as a delegate to the International Railway Congress, where, incidentally, 50-cycle traction is fairly certain to be thoroughly discussed. On balance, the suggestion made by the correspondent from Uganda seems to be an example of journalistic enterprise rather than an indication of a railway possibility.

Southern Province Line, E.A.R. & H.

A FURTHER step in the improvement of rail communications in East Africa will be taken when the Southern Province line of the East African Railways & Harbours from Mtwara to Ruo and Nachingwea, in Tanganyika, opens for the carriage of all public traffic on July 17. The deep-water port of Mtwara, the outlet of the Southern Province Railway, was opened for public business on January 17, 1954. Temporary port facilities at Mkwaya will be closed for public traffic from October 1 next. In 1948, Mtwara was chosen as the main port to serve the Overseas Food Corporation groundnut area. The railway was to be built from there to Ruo and then on to Nachingwea as the first temporary terminal to open up the groundnut area. As the port at Mtwara could not be built quickly and the route for the railway line from Mtwara to Ruo was known to present many difficulties, it was decided that, to move materials to the groundnut areas quickly and provide for the export of the first groundnut crops, the port of Lindi should be used as a temporary expedient and a railway laid from Mkwaya at the head of Lindi Creek to Ruo and then on to Nachingwea. This railway from Mkwaya to Ruo is now to be closed and lifted.

Combating Coastal Erosion

AN unusual railway engineering operation has been in progress since 1948 at Folkestone Warren, where the Southern Region main line to Dover passes over some two miles of land which, for at least two centuries, has from time to time slipped towards the sea. Boreholes were sunk as long ago as 1938 by the Southern Railway in an endeavour to discover the mechanism of the slip, and this work has been continued in recent years by the Southern Region of British Railways. Wave tank experiments also have been conducted at Queen's University, Belfast. The plan eventually adopted entailed driving a drainage tunnel to lower the level of the water table at the back of the Warren and thus reduce pressure, and also the weighting of the toe of the slip by loading the foreshore. The foreshore works and the shore line cliffs are being protected by a series of sea walls to prevent further erosion and obviate underpinning of existing sea walls. Part of the work on the foreshore is being carried out by a system of working between tides, and considerable labour and mechanical maintenance problems have been overcome by the Civil Engineer's Department of the Southern Region to meet the difficult conditions of the site. Delegates to the International Railway Congress will have an opportunity of seeing these works on a visit next Monday.

Theft from the Railways

THE loss of goods worth £18,000,000 by theft and pilferage since nationalisation is a measure of the security problem facing British Railways. This figure was given by General Sir Daril Watson, Chief of General Services, British Transport Commission, before the Select Committee of the House of Commons on the British Transport Commission Bill recently. It says much for the efforts of all concerned that measures taken to prevent the theft of vulnerable goods have reduced losses to about £1,000,000 a year. Sir Daril Watson revealed that organised gangs, equipped with lorries, had raided trains in the Leeds and Glasgow areas and had not hesitated to assault patrols. Most of the losses, he said, were "petty larceny on a grand scale." An organisation as large as British Railways is almost bound to have some employees who are not averse to pilfering, but the majority of the staff have given every assistance in trying to control the problem. It is to be hoped that the five year extension of the powers of the British Transport Commission police to search and arrest persons in the employment of, or employed on the premises of, the Commission, if granted as recommended by the Select Committee, will provide a period in which further vigorous action can be taken to minimise the rate of loss.

Railway Electrical Equipment Exports

IN the first quarter of this year electric locomotive exports from the United Kingdom increased in value from £630,189 to £755,366. Prospects in this field are encouraging, for developments in the 50-cycle system have stimulated interest in electric traction in general. When new schemes are studied, it may well be found in some cases that the margin of economy with 50-cycle equipment is small, so that orders for older-established types of equipment are liable to result. The same period showed an increase from £400,203 to £660,248 in value of diesel locomotives with electric transmission. At the same time diesels with mechanical transmissions declined in value from £358,988 to £345,857. Inquiries for diesels are numerous, but many are for the smaller locomotives in which it is possible that mechanical transmission will be chosen on price grounds. The increase in electrical equipments therefore may not be maintained at the same rate. Some of the inquiries, also, are evidently based on long-term projects and supply of the proposed units may be spread over some time. Apart from motive power, the prospects for fixed equipment for railway electrification are good at the present time, while economic development of overseas territories offers scope for higher exports of electrical signalling apparatus such as C.T.C., to increase the capacity of steam-worked lines.

A Driver's Peculiar Lapse

MR. J. L. M. MOORE'S report on the fatal collision on the Granton Harbour Branch on April 24, 1953, summarised in this issue, reveals extraordinary behaviour on the part of an experienced driver with a good record who, although he knew he was on a line not worked by block telegraph and therefore he had to be prepared to stop short of any obstruction, a line he was quite familiar with, nevertheless drove in darkness at excessive speed, for some reason Mr. Moore found it impossible to ascertain. The result was that he collided at something like 40 m.p.h. with an engine and vans, doing great damage and causing the deaths of a driver and guard. His fireman was strange to him and hardly knew the line, yet he seems to have relied on him to look ahead for him. The report characterises his conduct as "grossly negligent" and indeed, making every allowance, no less severe term could be found for it. Some signalmen had acquired the habit, liable on occasion to be very misleading, of indicating to drivers what they considered to be the situation in advance. This driver received no such warning, but declared that not to have influenced his action. Mr. Moore recommends

that the signal giving admission to the section, worked under yard regulations, should in future not be cleared until a train has been nearly or quite brought to a stand at it. Even the speed limit at this location was ignored by this driver.

The Sixteenth International Railway Congress

THE speakers at the opening on Wednesday in Church House, Westminster, of the Sixteenth International Railway Congress stressed the usefulness of the Congress in providing a forum for the exchange of railway technical and administrative information. Some account of the opening ceremony and speeches is given elsewhere in this issue. The Duke of Gloucester, as Honorary President of the Congress, declared the session open, as other members of the Royal family had done on the previous occasions when the International Railway Congress Association had held its sessions in this country.

The information exchanged in so liberal a spirit at this and other congresses is imparted for mutual benefit. Railwaymen in all countries, as Mr. Alan Lennox-Boyd, Minister of Transport, and an Honorary Vice-President of the Congress, stated in his speech at the inaugural ceremony, are ready to give information on their own subjects, and in this and other matters of co-operation between railways in different countries the common bond of railway service transcends nationality. On the occasion of this session British Railways and London Transport have gone to great lengths to ensure that what they have to show to delegates on their technical visits is of extreme interest, varying greatly in its range, and presented in a lucid manner. There is in addition in this country an unrivalled amount of knowledge about railways in many parts of the world which has been gathered over many years by British firms which manufacture locomotives, rolling stock, and other equipment for railways overseas. Delegates to the Congress will have an opportunity of seeing for themselves, next week, something of the extent of British industry supplying railway material, its methods, and the quality of its products.

In welcoming to this country on behalf of H.M. Government the 500 delegates and their ladies, Mr. Lennox-Boyd made particular mention of Monsieur Marcel de Vos, the new President of the International Railway Congress Association and General Manager of the Belgian National Railways, who is presiding at his first Congress session, and his predecessor, Monsieur Delory, who has retired after many years of leadership of the Association. Monsieur de Vos in his reply drew attention to the present situation of railways in most parts of the world, as did other speakers. In almost every country railways are facing rising costs in one form or another, and in many they are menaced by competition. Because of their inherent ability to move goods and passengers with speed and in safety, all except some of the smallest concerns have an important part to play in the economy of their respective countries and sometimes in international transport as well. The Congress can be of the utmost value in affording opportunities for railway officers from many different countries to compare notes on the way these problems are being tackled. It also enables railway officers to inform themselves on and to discuss new plant and techniques. Sir Brian Robertson, Chairman of the British Transport Commission and President of the session, said in his address that while most people believe that some form of co-ordination or co-operation between the various forms of transport is necessary, this does not mean protection of the railway industry from all competition. That would be impossible, and railwaymen should have more confidence in the industry than to ask for it. The industry must be ever diligent and resourceful in the practical application of science to its equipment, and must adopt the best modern methods of management, adjusting its services to meet the changing requirements of railway users. A point which he stressed was the very considerable co-operation between British railwaymen and their colleagues overseas

in the operation of train ferry and other rail and sea services to and from the Continent.

The agenda for this session includes some railway subjects of perennial interest, such as the efficiency of steam locomotives, the methods employed in financing station modernisation projects, and participation in road transport undertakings. Some questions of great topical interest are also being considered, such as the basic characteristics of electric traction systems, which must inevitably involve discussion of 50-cycle traction, and the application of radio-phonetic communication to railway working, discussed by a Congress for the first time. Sir Brian Robertson said that this Congress had provided the officers of British Railways with the opportunity for them to discuss freely with their colleagues from overseas the advances being made, or in sight, in the several aspects of railway work; this would enable them the better to carry out the task with which they had been charged, of formulating the details of bold and imaginative plans for large-scale modernisation and development of the railways in this country. This is good news, if such plans are to come early to fruition, and shows the immediate practical value of international meetings of this kind.

Much work has had to be done to make this session and other activities of the I.R.C.A., such as its monthly *Bulletin*, a success. Apart from the work of those who have organised the present session and who are responsible for its arrangements in this country, the work of the permanent staff of the Association, whose headquarters is in Brussels, deserves the fullest recognition. It was particularly gratifying last Wednesday to hear more than one speaker refer to the long and distinguished services of Monsieur P. Ghilain, Vice-President and Secretary General of the Association. Besides his work, and that of his staff, in Brussels, the work of organising the sessions in cities in other countries in conjunction with the railway and other authorities there, is largely a matter of international co-operation and goodwill, and the success achieved says much for those concerned. The work of the reporters also was praised by Mr. Lennox-Boyd and others at the inaugural meeting. As he pointed out, it would be impossible for the five Sections, whose scope has been indicated in previous issues of this journal, even to try to discuss the questions on their agenda without very careful preparation of the material beforehand by the reporters. The latter, who are officers of railways in many parts of the world, including Britain, which has provided five out of 26 reporters for the Sixteenth Congress, have performed an intricate task in reducing to workable proportions the mass of technical information on current practice supplied to them by the member railway administrations.

The Indian Railway Inspectorate in 1952-53

THE report of the Chief Government Inspector of Railways in India on the working of his inspectorate during the year ended March 31, 1953, states that, although no change took place in its organisation, certain proposals relating to the administrative organisation to suit the re-grouping of the railways were under the consideration of the Government. Moreover, the readjustment of the jurisdictions of the inspectors had been finalised, and instructions were issued by the Ministry of Communications towards the close of the year so that the changes could take effect from April 1, 1953.

The four circle inspectors held inquiries into the causes of 15 accidents during the year, as compared with 20 in 1951-52 and 23 in 1950-51. Of the 15, six were collisions, three derailments, two fires in passenger trains, and one each were lightning striking overhead traction lines, engine crew scalded by the stripping of a boiler stud in the cab, a tree being felled on to a running train, and a collision with a lorry at a level crossing. The three most serious of these accidents have already been briefly described in the summary of the Indian Railways Annual Report for 1952-53, in our issue of May 14. In all the 15 accidents collectively, 57 persons were killed and 220 injured.

The more important of the remaining 12 were (1)

the parting of a non-vacuum-braked 2 ft. 6 in. gauge mixed train and subsequent collision between the two parts; (2) a short-circuit caused by a bird dropping a piece of wire on to the pantograph of a Bombay suburban electric motor coach resulting in a fire in the roof and subsequent panic among the passengers, many of whom were injured by jumping from the train before it pulled up; (3) a broken axle accounted for the derailment of a metre-gauge mixed train; (4) a goods train ran into the rear of a stationary passenger train at a station when the driver over-ran stop signals; and (5) a detached wagon on a station siding was blown away by a gale and ran five miles down a main-line incline before coming to rest. There it was run into by a passenger train, the electric headlight of which did not disclose the presence of the wagon until too late to avoid a collision, as this happened on a curve; the engine capized on a bridge and the driver died of his injuries.

Due to heavy rain and floods there were interruptions to traffic on many sections of line varying in duration from 24 hr. to 5 months; in 21 instances the period was 12 days and over.

Problems of Automatic Train Control

WITH the introduction of the first fixed signals on railways arose the risk of their indications passing unheeded and of poor visibility rendering it difficult to see and act on them in time. It is not surprising, therefore, that among the many inventions met within the history of signalling no class has been more conspicuous than that covering what is known today by the general term of automatic train control. Elaborate mechanism came to be applied to ensure that when restriction of train movement was necessary signals should not fail to show the required aspects, but obedience thereto rested practically solely with the driver. Let him fail in this task, as now and then regretably he did, and much expensive equipment could be rendered temporarily useless.

Although many inventors have thought this problem easy to solve, it has proved in practice to be very much the reverse. The factors in it are many, including even the psychological, while railway operating conditions themselves vary so much as between different classes of traffic and changing local conditions, that no simple clear cut and generally applicable solution appears feasible, at any rate for the present. In addition, there are several types of signal on a railway and each can be disobeyed, with varying consequences, while changing circumstances can render this harmless at one time and very dangerous at another.

The complexity of this question was emphasised in the Presidential Address delivered recently before the Institution of Railway Signal Engineers by Mr. J. Holden Fraser, Chief Officer, Engineering (Signal & Telecommunications), British Transport Commission. He remarked that, in ultimate analysis, the control of trains was the subject the Institution existed to advance and in that the link between the wayside apparatus and the train represented the completion of "the chain between the signalman who is, speaking generally, in control of the traffic and the passenger who is, in the main, the traffic concerned and, like many last links, it is in some ways different from the rest of the chain and presents certain inherent weaknesses." Unlike other signalling functions this link "had to connect something moving with something stationary. . . ." Throughout the development of this problem, as railway engineering has advanced, there have been certain fairly clearly defined classes of equipment proposed, and at times used, for securing obedience to signals, which became more elaborate as electrical knowledge increased. The address reviewed the leading ideas involved in them and stressed their advantages and disadvantages.

The early devices were necessarily mechanical, although a few electrical ones appeared quite soon, and consisted of some element on the line working with the fixed signal and adapted to strike an attachment on the locomotive, producing a whistle or gong warning and perhaps operating some visual indicator. Applying the brake was not feasible while

hand brakes alone were available. Numerous variations of design appeared to meet the difficulty of the shock experienced at high speed, essential if the apparatus was to be applied to distant signals where, then as now, it was especially valuable. It was impossible to avoid adding load to the signal transmissions; nevertheless some success was attained with one or two purely mechanical designs in main line service, while in the simpler more uniform conditions obtaining on electrified lines a derivative of these ideas, the train-stop, ultimately proved satisfactory. There, however, it was seldom called on to work with a mechanical signal.

The successful application of telegraphs and allied equipment to railways encouraged the idea of making electric cab signalling arrangements incorporating a brush making contact with a short insulated conductor bar on the track and many such appeared. One form came into general use on the Northern line in France some 65 years ago and for a time was made to apply Smith's simple vacuum brake besides sounding the engine whistle. Later the brake application was given up and plain electrical cab signalling became general practice on the French lines. By combining such apparatus with the speed recorder, always used there on locomotives, and requiring the driver to give a vigilance acknowledgement on sighting an adverse signal, the aspect of which was itself recorded, the disadvantages of open circuit working have been countered to a degree where total failure can be considered a remote probability. The electro-mechanical type of equipment is a derivative of both these classes and aims at getting positive operation of the "warning" indication and if used, brake application with an electrical "clear" indication on the closed circuit principle. One form has become familiar here in the Great Western system, in which the mechanical action which opens the switch in the engine circuit is produced with fixed track apparatus, adding no load to the signal.

The use of magnetic fields to eliminate all physical contact between engine and track also early appealed to inventors and some of their proposals might have been relatively successful had it been possible to obtain permanent magnets of the kind now available, which at length enabled equipment to be constructed from which that proposed for standardisation on British Railways has principally been derived. Magnetic and other forms of inductive effect have been seen in "non-contact" systems in several countries and in the "continuous" types, applicable where track circuiting is itself continuous and which originated across the Atlantic, as distinct from ideas using a separate conductor throughout the line seen in a few experiments here.

Mr. Fraser pointed out that agreement on the method of effecting the link between track and train and producing some action on the latter opened the question of how best to turn that to account, also no simple matter. Widely diverging opinions on it have been entertained, again to some extent a product of circumstances. Arrangements satisfactory in countries where fog is little met with and never dense, in the sense in which that term would be used in this country, would be unacceptable here, where assisting the driver to be sure of his location and know he is nearing a signal is felt to be especially valuable. An arrangement requiring the driver to see his signal at some distance and forestall any brake action has its appeal where visibility is always good. A difficulty with any brake actuation system is the brake power available, the problem being simpler where all trains have continuous brakes.

The theory of the British equipment now on trial lay, Mr. Fraser added, between elaborate attempts at speed control as seen in, say, Germany, and the French practice of giving only audible cab signals. He stressed the significance of the indicator, which remains showing after a warning has been cancelled until the next signalling location is reached and is intended to provide against such action becoming forgotten, and also the operational significance of any tendency to assume a failure to have occurred when there has been none, or to carry out a cancelling operation without realising its significance, a tendency that can appear elsewhere in signalling operations and has at times, with serious results.

The address brought out very clearly how hard it is to meet every point involved in this old problem, any attempt to solve which must, as it pointed out, be subject to over-

riding economic limitations. Whereas it is possible to have, say, several forms of block telegraph in use at one time without serious difficulty, and more than one kind of signal, we cannot have half-a-dozen systems of A.T.C. and this explains why it has taken so long for even one or two countries to arrive at some uniformity. Once that is done, however, it becomes for like reasons correspondingly difficult to make any material change.

Canadian Railway Rating Problems

AN example of the restrictions on railway charges which have so often been imposed by legislation was given in Montreal recently by Mr. W. A. Mather, President, Canadian Pacific Railway, when addressing the annual meeting of the company. He was claiming that the low earnings for the past year reflected the need for modification of the rate structure to meet changed conditions. The annual report was discussed in our issue of April 9.

The most burdensome restriction, said Mr. Mather, was that which required the continuance by the railways of the reduced level of rates on Western Grain established in 1898 and 1899 under the terms of the Crowsnest Pass Agreement of 1897. That agreement originally provided for a lower scale of rates on grain moving eastbound to Fort William and on certain commodities moving westbound to Central from Eastern Canada. These rates were increased between 1918 and 1922, to enable the railways to meet the increased costs which resulted from the 1914-18 war. When these increases were removed, the railways filed tariffs for westbound commodities which applied the Crowsnest Pass rates only between such points as existed at the time the agreement was made.

These tariffs were set aside by the Board of Transport Commissioners, but the Supreme Court of Canada decided in 1925 that the railways had correctly interpreted the Crowsnest Pass Agreement. The Canadian Parliament enacted legislation at once which caused the Crowsnest Pass level of rates to apply to all grain and flour moving eastbound from all points on all lines of railway west of Fort William whenever constructed, but left to the board full power to deal with the westbound rates. These grain rates fixed at the 1899 level are still in force. In 1927 the rates for export grain moving to Pacific ports were lowered to the same level as those for grain moving to Fort William, and in 1953 one-third of the total freight traffic of the Canadian Pacific Railway Company moved at these low rates. Mr. Mather compared the average hourly wage of all employees in 1899, 18 cents, with the 1953 rate of \$159; new rail, which was \$22.32 per ton in 1899, was \$101.36 per ton in 1953 and the comparative prices of box cars were about \$600 and \$6,700.

While rates on other traffic have been increased to keep pace with costs, and the rates on grain in the United States on the other side of the border are now some three times those for comparable distances in Western Canada, the continuance of the Crowsnest Pass rates throws a disproportionate burden on consignors of traffic at normal rates. The fact that net earnings of the Canadian Pacific Railway have tended to be good in years when grain yields have been good is attributable to the general increased prosperity which such crops bring rather than to any increased receipts from the movement of grain. The growing burden of low grain rates, says Mr. Mather, has been the major factor in depressing railway net in relation to gross earnings to unprecedented low levels.

A change in Government policy, in Mr. Mather's opinion, would effect an improvement not only in railway net earnings but in the economy as a whole. The inability of the railways to meet competition more effectively has been indirectly responsible for the diversion to less economical means of transport of much high-grade traffic that could be moved better by rail. This has, in turn, resulted in a greater overall outlay on transport for the country as a whole than would have been necessary with a more rational railway rates structure.

London Midland Region Summer Timetables

THE most substantial acceleration achieved in the summer timetables of the London Midland Region is that of 85 min. from London to Belfast, gained by starting the "Ulster Express" from Euston at 6.20 instead of 4.55 p.m., with unchanged arrival at Belfast at 7 a.m. The train still calls at Crewe to pick up, but omits the Preston stop, and reaches Morecambe at 10.50 p.m. (35 min. acceleration), and Heysham at 11.6 p.m. The remainder of the speed-up has been effected by cutting the time at Heysham Harbour before departure of the steamer from 1 hr. 25 min. to 34 min. There is no alteration of this service in the opposite direction.

The fastest booked run in the London Midland Region will now be made by the morning business express from Euston to Liverpool and Manchester, altered to leave Euston at 7.55 instead of 8 a.m., and booked over the 140.6 miles from Watford Junction to Crewe in 135 min. start to stop (62.5 m.p.h.). Liverpool and Manchester will both be reached in 3½ hr. from London; the Manchester portion runs via Styal, avoiding Stockport. The 9.45 a.m. "Comet" from Euston to Manchester also becomes a 3½-hr. train, accelerated to reach Stoke, 145.8 miles, in 146 min., very nearly a 60-m.p.h. run.

The 4.30 p.m. from Euston to Liverpool, now called the "Shamrock," is altered to start at 4.55 p.m.; by omission of the Rugby and Crewe stops it is accelerated 25 min., and still reaches Liverpool at 8.22 p.m. This makes the third daily non-stop run over the 193.7 miles from Euston to Lime Street, in times varying from 207 to 215 min.; also the 6.10 p.m. down "Merseyside Express" is non-stop from Euston to Mossley Hill and reaches Lime Street in 3 hr. 40 min. A restaurant car train still leaves Euston at 4.30 p.m. for Rugby and Crewe, reached at 7.21 p.m., 11 min. earlier, but from there runs to Manchester instead of Liverpool.

The 8.30 a.m. from Euston to Liverpool is accelerated 17 min., arriving at 12.35 instead of 12.52 p.m. The 6.20 p.m. from Euston to Preston and Colne leaves London at 6.30 p.m. and calls additionally at Stafford (133.5 miles in 140 min., 57.4 m.p.h.), but is accelerated to reach Preston only 4 min. later, at 10.53 p.m.; the 5.5 p.m. from Euston to Blackpool also is accelerated, reaching Crewe 17 min. earlier (8.2 p.m.), and Preston 11 min. earlier (9.20 p.m.). The 5.20 p.m. to Holyhead starts at 5.15 p.m., runs non-stop from Chester to Bangor, and reaches Holyhead 10 min. earlier (10.46 p.m.). In the up direction the only important change is that the 8 a.m. from Manchester is separated from the 8.10 a.m. from Liverpool; the former runs through from Crewe as an independent restaurant car train and reaches Euston at 11.45 a.m., 15 min. earlier; the latter, otherwise unaltered, becomes the up "Shamrock."

On the London-Birmingham service the 9.5 a.m. and 6.50 p.m. down start at 9 a.m. and 6.55 p.m., respectively; in the up direction the four up 2-hr. trains, at 8.30 and 11.30 a.m., 12.30 and 4.30 p.m. from Birmingham New Street, all have their times over the 94.0 miles from Coventry to Euston cut from 95 to 94 min., so increasing the total mileage of 60 m.p.h. runs in the London Midland Region by 376 miles to a total of 1,030 miles daily, made up of 11 runs; previously there were six runs totalling 654 miles.

Among Anglo-Scottish trains, the "Royal Scot" is put on its usual summer working, carrying passengers only between Euston and Glasgow but with a service stop outside Carlisle for changing engines. The time is brought down from last summer's 7½ hr., which continued throughout the winter in the up direction, to 7¼ hr., with arrivals at both terminals at 5.15 p.m. The up "Midday Scot" is accelerated by 10 min. to reach Euston at 9.45 p.m., in 8¼ hr. from Glasgow.

In the Midland Division there are changes in the working of the late evening restaurant car express from St. Pancras to Sheffield. When first introduced, this started at 6.40 p.m. and was non-stop to Nottingham; later the starting time was altered to 7.10 p.m., and later still a Kettering stop was introduced. The starting time now goes forward again to 6.33 p.m., and the train is diverted from

the Nottingham to the Derby route, replacing the previous 6.33 p.m. relief to the 6.40 p.m. down Manchester, but omitting the Leicester and Loughborough stops of the latter, so that for the first time for many years past a non-stop run is introduced over the 128.5 miles between St. Pancras and Derby. The time of 140 min. (55.1 m.p.h.) is an acceleration of 13 min. on that of the existing 6.33 down, and the 3 hr. 22 min. to Sheffield is 28 min. quicker than that of the existing 7.10 p.m. down. A 7.10 p.m. from St. Pancras will continue to run from St. Pancras to Nottingham, but Nottingham passengers will be deprived of their restaurant car facilities, the last train of the day from St. Pancras to Nottingham with restaurant cars now being the 4.50 p.m.

On Saturdays, as every summer, the entire main line services on both Western and Midland Divisions are greatly augmented, but also slowed; there are no runs on Saturdays timed at 60 m.p.h. All the usual cross-country services are run to the various seaside resorts on both the east and west coasts with certain additions at peak traffic periods.

Twelve Weeks Railway Operations

(By a correspondent)

NUMBER 3, *Transport Statistics*, is the first of the quarterly issues for 1954 and gives the principal operating statistics of British Railways for the 12 weeks to March 28. The period was one of growing activity in general business, the "all industries" index of production being estimated at 130 against 121 for the first quarter of 1953. Coal output failed to expand, but steel production rose to 384,800 tons a week in March, the highest level ever reached. The weekly make of pig iron in March set up another record at 230,900 tons and the manufacture of rayon yarn also reached a new peak.

The total volume of freight transport of all kinds must have exceeded 1953 requirements, but in the first 12 weeks British Railways originated 283,000 fewer tons of freight train traffic. They lost 52,000 tons of merchandise and 301,000 tons of minerals, but gained 47,000 tons of coal and coke. The decline in merchandise forwardings was serious, coming after a decrease of about 1,350,000 tons last year, or 2.7 per cent. The trend of merchandise receipts points to a further loss of high-class tonnage in the four-week period to April 25.

During the 12 weeks to March 28, British Railways worked 5,410 million ton-miles, a decrease of 37,308,000 (0.7 per cent). The large decrease of 62,740,000 ton-miles (3.2 per cent) was in the London Midland Region, while the Eastern Region worked 28,830,000 more ton-miles (2.5 per cent), the North Eastern 11,103,000 more (2 per cent) and the Western 5,758,000 more (0.6 per cent). The corresponding wagon-miles totalled 1,067 million, a decrease of 5,272,000 (0.5 per cent). Again the London Midland Region had the large decrease of 6,298,000 wagon-miles (0.5 per cent), while the Eastern Region worked 1,827,000 more wagon-miles (0.8 per cent) and the Western 1,277,000 more (0.7 per cent).

To deal with these considerably varying traffic conditions, British Railways ran 453,000 additional freight train-miles, an increase of 1.3 per cent, and kept train engines 25,000 hours more in traffic, an increase of 0.6 per cent. The London Midland Region worked 60,000 more train-miles, but saved 26,000 train engine hours. The Eastern Region worked 125,000 more train-miles and 11,000 more train engine hours, while the Western worked 180,000 more train-miles and 36,000 train-hours. The Eastern Region arrangements were adjusted skilfully to deal with the extra traffic movement, as shown by the operating results which are quoted below. The all-line output of freight train working, as measured by "net ton-miles per train engine hour" dropped from 1.106 to 1.090 in the 12 weeks. The decrease would have been larger but for satisfactory returns of 1,405 from the North Eastern Region and 1,246 from the Eastern, representing the haulage of a trainload of 177

tons at 8.49 m.p.h. The London Midland Region output receded by 18 points to 1,048 and the Western figure by 44 points to 1,005. The Western moved its average trainload of 159 tons at the slow speed of 8.08 m.p.h., well below the all-line average speed of 8.33 m.p.h.

The other all-line average which is a measure of mobility, "wagon-miles per train engine-hour," slipped back from 218 to 215. The Eastern Region worked 29,914,000 more wagon miles than the Western in 65,000 less train engine hours, and thus recorded an average of 237. As usual the North Eastern headed the list by working 256 wagon miles in a train-hour.

The impression formed from this survey of freight operating statistics is that further energetic measures are needed to increase mobility on some sections of British Railways and use freight rolling stock to better advantage. In particular, there is scope for a drive to improve the average wagon load at starting point of merchandise and livestock, which during the 12 weeks under review was 4.08 tons for the whole system. The Western and Scottish Regions loaded to 4.16 tons, the Eastern to 4.28 and the North Eastern to 4.56, but the London Midland general average was 3.83 tons, slightly less than its 1953 figure. Though merchandise revenue tons and ton-miles were lower, the London Midland Region forwarded 14,000 more loaded wagons this year, an increase of 1.5 per cent. A reasonable improvement in loading might have saved these 14,000 wagon journeys.

In the month of January, the number of passengers on British Railways was 86,443,000, a decrease of 417,000, but in February, 66,328,000 people were carried, 2,699,000 more than last year. About 43 per cent of the additional business arose in the Southern Region. Over the two months, first class travel showed an increase of 66,000 passengers, or 2.1 per cent. During the 12 weeks to March 28 British Railways ran 246,000 more coaching train miles, the largest increase in this respect being made by the Western Region.

Letters to the Editor

(The Editor is not responsible for opinions of correspondents)

Lightweight Diesel Trains

May 11

SIR,—It is to be hoped that the appearance of the lightweight diesel trains marks the beginning of a more enlightened stewardship of British Railways, although the wisdom of using four sets of engines and auxiliaries when one would suffice is difficult to understand.

A more immediate point of interest is the methods of construction adopted. The late Railway Executive made a great point of the economies alleged to be gained by rigid standardisation and this policy was taken to extreme lengths. The latest Southern Region two-coach electric units, for instance, are obviously an adaptation of the British Railways steam coach design and as such are not likely to be any more successful than similar hybrid vehicles now in service.

On the other hand, the diesel trains owe nothing to British Railways standards. Indeed, although in a paper read at the Institution of Locomotive Engineers in January, 1951, on standardisation of British Railways coaching stock, a detailed argument was put forward against the adoption of integral construction of body and underframe, such integral construction is a feature of the diesel cars. Furthermore, the eminently desirable automatic couplers adopted as a B.R. standard are omitted from these cars.

One wonders whether standardisation is now out of fashion or merely that one hand knows not what the other does.

Yours faithfully,

W. J. WILLIAMS

10, Rathgar Avenue, Ealing, W.13

THE SCRAP HEAP

On the Axles

Three men are reported to have arrived in Paris who claimed to have travelled for 48 hr. "on the axles" of a through passenger vehicle from Zagreb, in Yugoslavia. There are many reports of travel "on the axles," but a continuous journey, even with stops, of 48 hr., and by three men, seems unprecedented. The design of bogies in modern Continental passenger stock makes such travel almost impossible; and it seems improbable that none of the three was discovered either by Customs or other officials at the examinations at frontier stations, or by train examiners at principal halts.

Gauge Compromise

More than 100 years ago the "battle of gauges" was raging in Ireland. It began when the Dublin & Drogheda Railway decided on a gauge of 5 ft. 2 in. while the Ulster Railway Company had a 6 ft. 2 in. gauge. In the

deadlock which followed the Board of Trade sent over their Inspector General of Railways, Major-General Pasley, formerly of the Royal Engineers.

He tackled the problem with military vigour and undoubted impartiality. After writing to the leading railway engineers of the day he sifted their answers. From these he discovered that 5 ft. was the narrowest and 5 ft. 6 in. the widest advisable for economy and convenience in construction. By splitting the difference he arrived at 5 ft. 3 in.—and there the Irish railway gauge has remained.—From the "Belfast News-Letter."

Memories of a Branch Line

To all who saw her the *Titfield Thunderbolt* was a glorious Technicolor sight. Snorting defiance at bureaucracy, she puffed her way along a branch line which was threatened with extinction, and should her passengers be required to wait while the en-

gine driver poached pheasant and the fireman shot rabbit, it was all part of the old leisurely way of life. But that was on celluloid; outside film studios it is not often like that. Little branch lines die and soon there will be few to remember them. R. O. Blair Cunyngham recalls one such in a broadcast. It ran from Dumfries, up Glencairn to Moniaive—18 miles through the Scottish valley which was his home.

This particular branch line opened in 1905 and, after a gallant rearguard action as "goods only," is now closed. Little remains today but the embankments and cuttings. But Mr. Blair Cunyngham thinks of the days when a little quiet fishing was done while a truck or two was being picked up at a station—of the stationmaster in his gold-laced cap and frock coat, and of the politely flexible timetable which did not permit that any regular passenger should be left behind.—From the "Radio Times."

The New Elite

(Some observations on the alleged metamorphosis of the modern messenger boy)

Time was, when, with swift-winged zeal,

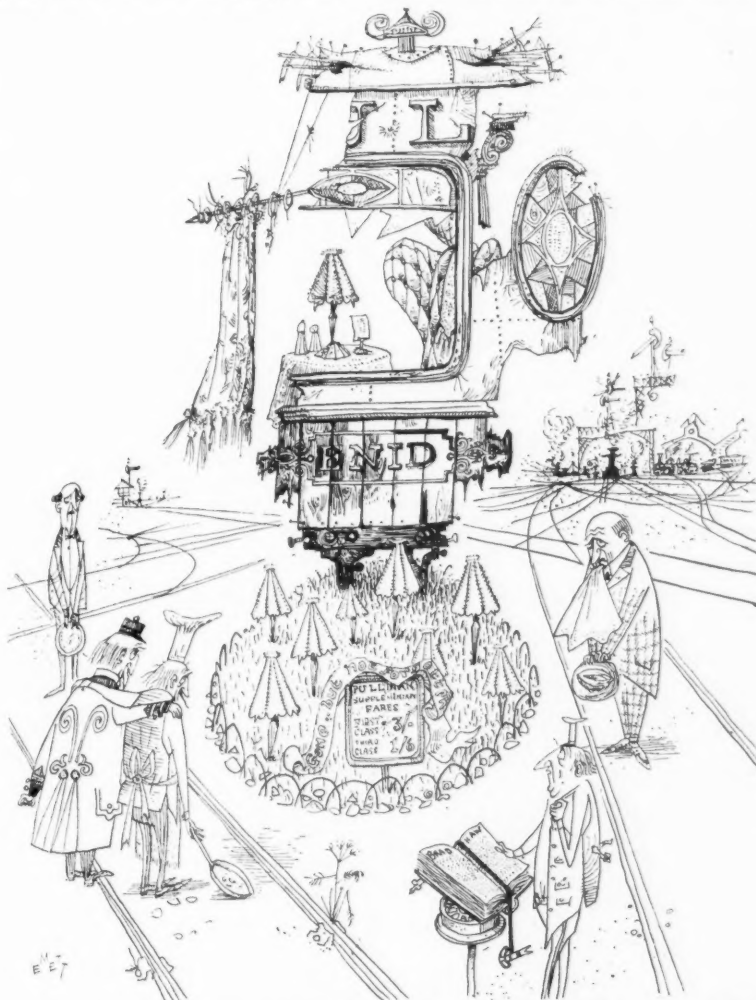
He nursed his plaintive *clientèle*
And, by and large, from day to day,
Office relations were O.K.
We suffered him, he bore with us,
Mutually magnanimous.
If one could criticise, maybe
There was a certain tendency
To dilly-dally out of doors
And raise Cain in the corridors,
But, underlying all this verve,
His motto ran: "I also serve."

Alas! these more enlightened days
Breed other manners, odder ways;
I'm told these sons of Mercury,
Though radiant sartorially,
Seem disinclined to work or play—
No ministering angels they.
Their market value has gone up
And, as for washing out a cup
Or putting on the morning brew,
Such menial matters they eschew.

We ancient ones can still recall
Those friends of ours, who, loved by all,
Adorned their own particular sphere
And would have thought it mighty queer,
Had simple service been construed
As soul-destroying servitude.
Pride is confused with privilege,
That fragile flower "*noblesse oblige*,"
Banished, recoils in shy retreat—
The age evolves its own *élite*.

Well, now, that's what some people say
About these youngsters of today,
But I, for one, to tell the truth,
Find little fault with modern youth;
They have their own peculiar ways
And so had we in bygone days!

A. B.



A suggestion for a quiet Garden of Remembrance at Crewe when the Pullman Coach has been taken over by British Railways

[Reproduced by permission of the proprietors of "Punch"]

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NEW ZEALAND

Closing of Nelson-Glenhope Branch

All goods and passenger services on the Nelson-Glenhope line (59 miles) are to be suspended shortly, and there is to be an immediate increase in expenditure on road construction and improvement in the area. In stating the position, the Minister of Railways, Mr. W. S. Goosman, said the high operational losses, declining traffic and heavy costs of track and bridge renewals were the principal reasons for the Government decision.

Operational losses had become increasingly heavy on this line, said the Minister, and traffic had been steadily declining.

Affected land owned by the Railways Department, including the line reserve, would be leased under terms that would keep it available to the Government should it be decided at some later date to resume operations in the Nelson area.

CANADA

Faster Transcontinental Services

New motive power and rolling stock are reported to make possible reductions of the Canadian Pacific and Canadian National Montreal-Vancouver schedules to less than 80 hr.

At present the C.P.R. makes the Mon-

treau-Vancouver run in 87 hr. 25 min., and the return in 82 hr. 50 min. The C.N.R. route affords similar running times. The fastest time ever made by a train operating from Vancouver to Montreal is stated to have been with a "silk special," in 81 hr.

New diesel motive power, which will be available for transcontinental runs on both the C.N.R. and the C.P.R. in about a year, will mean fewer stops for servicing. It is doubtful, however, if running times will be cut.

The first passenger train to run from Montreal to the west coast took 132 hr. This timing was cut progressively, but never dramatically, until in the early 1930's, when the C.P.R. inaugurated its "Dominion" trains, which set the times adhered to now.

UNITED STATES

Electric Operation Ended at Detroit

Between Detroit and Windsor the main line of the Michigan Central Railroad (New York Central System) passes by twin tunnels, each 2,790 yd. long, under the Detroit River, which connects Lakes Huron and Erie. Since 1910 the working through these tunnels has been by electricity, with change of locomotive at each end of the 4½-mile section which is electrically-equipped. As this main line is now entirely diesel-

operated, electric working was abandoned at the end of 1953.

The total of electrified track was 28 miles, and the equipment will now be removed. The original 90-ton and 107-ton electric locomotives have been replaced in recent years by units transferred from the New York - Harmon section of the New York Central and from the Cleveland Terminal—the latter also now completely diesel-operated—and these will probably be scrapped. At Detroit a forced draught ventilating system has been installed of sufficient power to clear the twin tunnels of diesel exhaust fumes.

FRANCE

Time Recovery on Main Lines

On February 3, one of the coldest nights of the winter, the Paris-Marseilles train No. 55 left Paris-Lyon 66 minutes late at 11.6 p.m.

It reached Avignon on time at 6.22 a.m., having covered the 461 miles at an average speed of 63.5 m.p.h., including three intermediate stops. The train was composed of 15 coaches with a total weight of 663 tons. On February 11, the late arrival of the connecting Spanish train from Madrid caused the "Sud Express" to Paris to leave Hendaye 55 minutes late at 11.40 a.m. It arrived at Paris Austerlitz only 14 minutes late at 6.54 p.m., having covered the 507 miles at an average speed of 70 m.p.h., including two intermediate stops.

Sceaux Line Improvements

Towards the end of 1953 two new passing loops were brought into use at Laplace on the Sceaux lines of the Paris Transport Authority (R.A.T.P.). These lines include the section from Paris-Luxembourg to Massy-Palaiseau operated by the R.A.T.P. and the section from Massy-Palaiseau to Saint-Rémy-Chevreuse operated by the S.N.C.F.

Services on these lines are maintained by four-coach stopping trains and by fast trains not stopping between Paris and Massy-Palaiseau. During peak hours the trains have been overloaded and the R.A.T.P. studied two possible remedies. One of them, lengthening trains, was rejected as impracticable because of the great expense involved in lengthening stations and sidings.

The Sceaux lines are double-track throughout, with no multiple track, and reduction of the headway appeared impossible unless the fast trains were withdrawn and all services run at constant speeds by stopping trains. Finally, it was decided to revise the timetable to make it possible to concentrate passing movements at Laplace; by the installation of two short connecting links, two terminal lines were converted into passing loops.

British-Built Diesel Locomotives for Western Australia



The first of the 48 1,105-h.p. 77½-ton diesel-electric locomotives built by Metropolitan-Vickers Electrical Co. Ltd. for the Western Australian Government Railways, on a trial run between Fremantle and Perth

Sixteenth International Railway Congress Opened

Inaugural ceremony at Church House, Westminster, performed by H.R.H. the Duke of Gloucester : opening speeches

THE Sixteenth Session of the International Railway Congress Association was opened at Church House, Westminster, on the morning of May 19, by the Duke of Gloucester, Honorary President of the Congress. Some 500 delegates and their ladies were present. On arrival at Church House His Royal Highness was received by the Mayor of Westminster, Alderman C. P. Russell, the Chairman of the London County Council, Mr. Victor Mishcon, and the Minister of Transport & Civil Aviation, Mr. Alan Lennox-Boyd, who is an Honorary Vice-President of the Congress.

The Duke of Gloucester, addressing the delegates, said that in the name of H.M. the Queen, and as Honorary President of the Session, he extended a most cordial welcome to those who had come to London for the Sixteenth Session. It had always been the tradition of these islands, he added, to welcome those who came from overseas for peaceful purposes, and the welcome was particularly warm when made, as on this occasion, to the representatives of so many of the railway administrations of the world.

Forum for Exchange of Ideas

As the pioneer of railway development it was natural that the United Kingdom should have taken keen interest in the development of railway techniques in other countries. The forum which the Congress had provided, since its first session in Brussels in 1885, for the interchange of technical and administrative information and ideas on railways had always commended itself to the Government and the railway administrations of Britain.

The Congress was last welcomed in London in 1925, the year of the centenary of the first railway in the world, and it was gratifying that the International Railway Congress Association had accepted the invitations to make London the scene of the Sixteenth Session.

Nothing but good could flow from the free interchange of ideas and experience in the spirit of friendliness and co-operation in which an international organisation such as the I.R.C.A. carried on its work. The Duke of Gloucester wished the Congress success in that work, and especially in its present proceedings. He hoped that delegates would enjoy their stay in this country. There could be no doubt about the pleasure and benefit which those in this country would derive from their visit.

He then declared the Session open. Monsieur Marcel de Vos, President of the International Railway Congress Association, said that the Tenth Session of the Congress had been held in London in 1925, the anniversary of the opening of the Stockton & Darlington Railway. That session had been opened

by the then Duke of York. Before that, the Fifth Session, in 1895, had been opened by the then Prince of Wales. In transmitting to the delegates today the welcome of H.M. the Queen, in accepting the Honorary Presidency of this Session, and in performing the opening ceremony, the Duke of Gloucester was showing once again the high regard which the Crown felt for the work of the Congress.

He then thanked H.M. Government for its support and also Mr. Alan Lennox-Boyd personally for the part he had played in providing that support. Railways, he added, still had important functions in the service of the community. Questions to be dealt with at the Congress were largely of a technical nature, but he felt he must refer to the present transport situation. Even in 1937, at the Thirteenth Session in Paris, there had been a reference to road transport.

Division of Transport Functions

He thought that rail, road, air, and water transport should divide traffic harmoniously between them, each taking the part most suited to its economic characteristics. This was a matter for Governments. In the meantime the railways continued untiringly their march of progress. Above all, they sought to improve service, to approach even nearer to absolute safety, to reduce charges, and to improve travel conditions.

M. de Vos then dealt with the work of the five sections, already described in our issue of April 9, and thanked the B.T.C., British Railways, and the Organising Committee for all that they had done. In conclusion, he mentioned the names of several colleagues who had died last session.

Mr. Alan Lennox-Boyd welcomed delegates, on behalf of H.M. Government, to the country which was the birthplace of railways. He expressed pleasure at the presence of Monsieur de Vos, the new President, who was presiding at his first Congress Session, with his predecessor, Monsieur Delory, who had just retired after many years of distinguished leadership of the Association with the very able support of the General Secretary, Monsieur Ghilain, who he was glad to say was taking an active part in this Session.

The value to Britain and other countries of these gatherings of experts in all branches of railway management, operation and engineering, where the fullest knowledge was brought together and the results of experience acquired under great variety of conditions were interchanged was fully recognised. Nowhere more than among railwaymen was such readiness found to put experience at the disposal of others most generously and without reservations.

He thought it might be said that the common band of railway service transcended nationality.

Much had happened in the world since the Tenth Session was held in London in 1925, the centenary year of the British Railways, Mr. Lennox-Boyd continued. Times were more difficult for railways almost everywhere if only because their former monopoly no longer existed. Their capacity to carry heavy loads at high average speeds seemed to ensure their continuance for many years; but with strong competition from other modes of transport and greatly increased costs of labour and material there was more need than ever before for efficiency, which must always benefit from the study of current developments in railways of all countries.

Referring to the work of the Session, he said that the comparative methods of different systems of electrification would be considered in the light of the far-reaching experiments with alternating current traction at standard frequency which were now in progress. The steam locomotive was perhaps entering the last phase of its history, but the general displacement of steam traction was still a long way off. It was still necessary to develop its efficiency and economy to the utmost, and he was sure that all of them would profit from their discussions on this subject.

Discussion of New Methods

With railway operating, recent technical developments had secured great economies with improved traffic flow by the centralised remote control of signalling installations. They would be exchanging their experiences of these methods, and for the first time at a Congress session they would be considering the application of radiophonic communication to railway working.

At so large a congress, Mr. Lennox-Boyd continued, no useful discussions could take place without the most careful preparation and summarisation of the subject, and he wished to express the appreciation of H.M. Government of the able and painstaking work of the reporters.

For the foreign delegates and their ladies they would do their best to make their stay in Great Britain both pleasant and profitable.

H.M. Government also wished to associate itself with the tribute to the memory of those distinguished members whose loss the Association had suffered since the last Congress. Their work was a memorial and an inspiration to those who followed them.

Sir Brian Robertson, Chairman of the British Transport Commission, and President of the Session, welcomed delegates on behalf of British Railways and

London Transport. It was, he said, in accordance with the precedents of the previous Congresses held in London in 1895 and 1925, that a member of the Royal Family should accept the office of Honorary President.

In 1925, he said, when the Congress was last held in London, the railways of Great Britain were recovering from the effects of the first world war, and were reorganising themselves after grouping in 1923. Since 1925, they had had to face another world conflict, and 1954 saw the railways once more overtaking the effects of war, and again in the midst of administrative re-organisation.

The President of the I.R.C.A., Sir Brian Robertson went on, had recalled that the Congress of 1925 had been arranged to coincide with the centenary of the Stockton & Darlington line—the first railway in the world to be opened to the public. Today, they were well into the next railway century, but their faith in the fundamental economics and efficiency of the railways for suitable traffics remained undiminished.

From the Stockton & Darlington line, British Railways had grown into a great enterprise of 52,000 track miles, employing 600,000 staff, and claimed to be the busiest system in the world. Every weekday, they carried some 2,700,000 passengers and nearly 1,000,000 tons of freight, and owned some 19,000 locomotives, 42,000 carriages and well over 1,000,000 freight wagons.

All this was quite apart from the system of the London Transport Executive. The London Metropolitan of 1863 between Paddington and Farringdon was the first underground railway, and London Transport today was the world's largest urban passenger transport undertaking.

Bold Planning Needed

The pioneer had always to ensure that the methods and techniques of the early exploratory days were not accepted without challenge as a pattern for all time. The British Transport Commission, said Sir Brian Robertson, believed that the stage had been reached when there should be an imaginative and bold plan for large-scale works of modernisation and development.

The Commission believed that there was a sound economic case for such a plan in the interest of traders, of passengers and of national wellbeing, and set itself the task of formulating the details. This Congress would provide the opportunity for them frankly and freely to discuss with their colleagues from overseas all the advances that were now being made, or were in sight in railway work.

In their various countries, he went on, they must seek co-operation on a fair basis between different forms of transport. If they were diligent in the pursuit and application of scientific research and in adoption of modern techniques and in adjusting their services to the changing requirements of traders

and the travelling public, the railway industry could still have a major part to play in national and international transport.

British Railways in recent years had become increasingly aware of the value of international co-operation, Sir Brian Robertson added. Some of the delegates from the continent of Europe and from Ireland were already in close and friendly touch with British railwaymen, in the joint endeavour to provide efficient train connections with the ships across the narrow seas, including the two train ferry services from Harwich and Dover. He hoped the meeting would further enhance the happy relations which existed. There were others who were possibly visiting this country for the first time, and he trusted they would find the Congress and its activities both stimulating and interesting.

Monsieur de Vos thanked Mr. Lennox-Boyd and Sir Brian Robertson for their speeches. He was sure he would be expressing the delegates' feelings in saying how much they were obliged to them. He then put forward the name of Mr. Alan Lennox-Boyd for the approval of the delegates as Honorary Vice-President of the Sixteenth Session.

Sir Brian Robertson was then formally proposed as President of the Session with Sir John Benstead as Vice-President. These appointments were approved with acclamation.

Sir Brian Robertson then took the chair as President of the Session. He thanked the Congress for the honour it had done him by electing him. This, he said, was the first occasion at which he had been associated with the I.R.C.A. and he looked forward to meeting delegates individually.

His first formal duty, he said, was to declare that the principal delegates of each adherent Government had been appointed Vice-Presidents. His next duty was to ask the delegates to proceed with the election of the General Secretaries for the present Session. He was quite sure that the names of Monsieur Ghilain, General Secretary of the Permanent Commission, and Mr. C. E. Whitworth, would commend themselves, and he declared them unanimously elected.

If they looked at the issue of the *Bulletin* containing the record of the 1925 meeting, they would see that Monsieur Ghilain was then General Secretary of the Association and of the Congress, and they were fortunate that through those difficult years they had had the advantage of his advice.

Technical Visits and Excursions

Reference was then made by Sir Brian Robertson to the work of the Congress and to the technical visits and exhibitions. As to these, he hoped delegates would be able first to inspect some of British Railways and London Transport modern equipment and installations; secondly to obtain an insight into British railway methods and organisation, and thirdly to see some of the

scenery of Britain. The Arrangements Committee had been working for a long time past to provide for delegates' requirements, both at Westminster and elsewhere, on the visits and excursions. They need be assured that all in British Railways and London Transport would not relax in their endeavours to make the Congress a memorable one.

Besides the speakers, those present on the platform included Monsieur E. Dorges, of the French Ministry of Transport; Lord Hurcomb, former Chairman of the B.T.C.; Sir Gilmour Jenkins, Permanent Secretary, Ministry of Transport; Monsieur P. Ghilain; Sir John Benstead, Deputy Chairman of the B.T.C. and Vice-President of the Session; Monsieur J. Goursat, Vice-Chairman of the I.R.C.A.; and Sir John Elliot, Chairman, London Transport Executive.

Willesden Carriage Cleaning Depot

In the afternoon, the delegates were free to visit Willesden Carriage Cleaning and Servicing Depot, London Midland Region, opened in March and described in our issue of March 13, 1953.

An alternative visit arranged for the afternoon of May 19 was to the electrical control rooms and sub-stations in the 50-cycle conversion scheme of the Southern Region, described in our issues of March 19 and April 16, 1954.

A reception was given in the evening to delegates by H.M. Government, at the Tate Gallery.

The programme for May 20 included an afternoon visit by train to the Locomotive, Carriage and Wagon Workshops of the Western Region at Swindon. Arrangements also made were for delegates to visit the London Transport Civil Engineering Depot at Lillie Bridge.

Southampton Docks

The technical visit arranged for today (Friday) are to Southampton Docks and to the Liverpool Street-Shenfield electrification of the Eastern Region and the Central Line tube extension, London Transport.

The visit to Southampton has been arranged to include a cruise on Southampton Water, to enable delegates to see much of the extensive shipping, railway, docks and industrial installations of the port, including the Ocean Terminal, opened in 1950.

The visit to the Liverpool Street-Shenfield electrification will allow delegates to see features of the recently completed comprehensive scheme to improve suburban services in north-east London, including the electrification of the Shenfield line on the 1,500-V. d.c. system, its associated re-signalling and the extension of the London Transport Central Line Tube services. The party will travel by special electric trains and will inspect the electric power supply system, the depot for servicing, maintenance and repair of rolling stock, and the new stations with their facilities for interchange between rail and road.

*Sixteenth International Railway Congress***Radio-Telephony or Telegraphy in Railway Operation***Point-to-point services; marshalling yards; communication between dispatcher and train; controlling engineering operations; emergency working; television*

THE reporter for Question 5 for Austria, Germany, Belgium, France, Portugal, Bulgaria, Czechoslovakia, Yugoslavia, Greece, Hungary, Switzerland, Luxembourg, Netherlands, Poland, Roumania, Spain, Switzerland, Syria and Turkey, with any colonies concerned, was Dipl. Ing. J. Frischauf, Chief of the Telecommunications Department, Austrian Federal Railways.

Replies to the questionnaire were received from 35 managements, 21 of which had no installations of the type concerned, nor had they made any trials. Those that have, use radio chiefly for marshalling yards, the oldest French installations dating from 1947. Good results have been obtained by several railways from wireless links between the wagon markers and the hump cabin. Communication between permanent way gangs, signal boxes and stations also is being used and from shore to ferry or tug boats.

In Spain and especially in Italy, there are several installations of radio between fixed points, such as district offices and traction supply stations. In Switzerland, portable equipment is being used for regulating train movements and supervising braking tests, on long freight trains where it is impossible to see from one end to the other. In Cambodia wireless has been adopted because wired circuits frequently are damaged in civil disturbances.

Some managements are conducting trials between trains in motion and public broadcasting services, also between the ends of a train or between a train and a road vehicle. Some have found such arrangements satisfactory and others not. Communication with the moving train has been found beneficial in many cases. There are several examples in Germany.

Proposed Zonal Organisation in Spain

The Spanish National Railways propose dividing their territory into a number of zones, with defined boundaries, with their own wireless stations and another in Madrid giving communication within each zone and between central offices and other points by switching arrangements. The costs of these arrangements vary greatly depending on the type of equipment, power consumption, form of modulation, etc. Maintenance charges likewise vary considerably. Range of working is generally up to 3 miles in marshalling yards—less for portable equipment—and up to 6 miles for permanent way gang apparatus. Fixed equipment frequently covers long distances. Design varies with circumstances and special types have been developed to withstand rough conditions in marshalling yards. To avoid

multiplicity of parts similar transmitters and receivers are used for both fixed and locomotive locations.

Frequencies generally cover wavelengths of 2 or 4 m. but figures of from 460 to 540 are met with. In every country licences are issued by the authority having the monopoly of telecommunications. Use of railway installations usually is restricted to railway purposes and connection with the public service ordinarily not allowed.

Communication with Moving Trains

Many experiments were made, in Italy and elsewhere, on the general subject of communication on and with moving trains, especially on electric lines. It was thought that the problem could be solved in open country by using ultra-short waves and on electrified lines by using carrier current and the contact line. It was proposed to set up a system of eight fixed points on the Naples-Milan line to communicate with trains over an area 525 miles long.

Tests were again conducted in tunnels and the Austrian lines carried out similar ones with varying results. Some managements have met transmission difficulties in built-up areas. Large masses of metal near the line give rise to "fading" while traction circuits also interfere with certain types of transmission. In some countries seasonal disturbances are experienced varying from considerable noise in the receivers to complete interruption, as during torrential rain.

To counteract external noise on engines some lines use horn type loudspeakers. Calling is usually by voice but sometimes by Morse code. Both general and selective calling is used with mobile units.

As a rule maintenance is done by railway staff, but overhauls are sometimes entrusted to manufacturers. Opinion on the relative costs of wired and wireless communication differs; comparison is not easy, as the latter performs functions impossible to the former. Many managements form their own maintenance staffs using special courses combined with attendance at suppliers' works. Operating the apparatus is always made as simple as possible, to avoid many special instructions.

Several railways covered by this report are investigating the question of effecting connection with the public telephone service for passengers' benefit. Some trials have been made, but generally such facilities prove too costly and cannot be made to pay.

There is a certain amount of teleprinter work in connection with wireless circuits. No management has actually

replaced the ordinary communication circuits by wireless; all regard the latter as supplementary to the former. It has, however, allowed of certain fixed-type shunting signals being abolished in marshalling yards. The general opinion is that radio is reliable and failures are within acceptable limits.

Marshalling Yards

The principal advantages to be derived from radio are considered to be the quickening of important operations, especially in yards where it becomes possible to keep the working going almost normally, even in fog or other bad weather when otherwise great delay would be occasioned. Direct communication with the shunting engine drivers removes many sources of misunderstanding and saves time. Some put the gain at about $\frac{1}{3}$ over older methods.

Work on Permanent Way

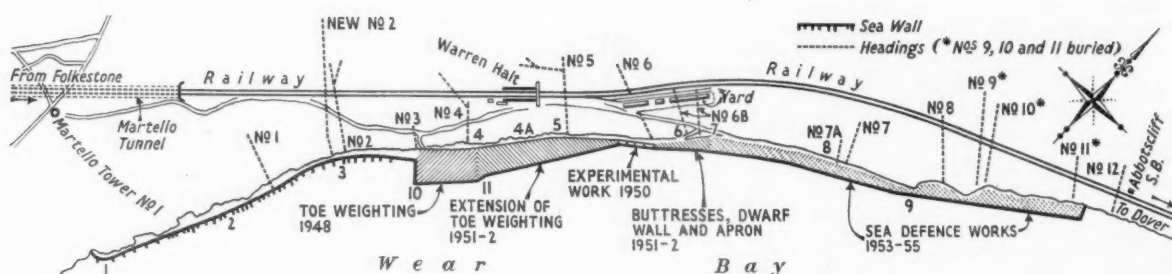
This again applies when communicating with permanent way gangs. The track can be cleared in good time but without undue hurry. There is no transport of cables and cable drums, as required by older arrangements. Communication with moving trains being in Europe still really only experimental no opinion can be given on its economic aspects, but it is expected that it will yield good results eventually, as has occurred elsewhere. Nothing equivalent could be obtained over wired circuits without very great expense.

As far as existing radio arrangements are concerned all managements are agreed that they have fully justified themselves while several look forward to a considerable extension of them, although no new departures are for the time being envisaged. Use of radio in association with C.T.C. is being studied, however, also direct communication between trains and dispatchers for colonial lines.

Radar and Television

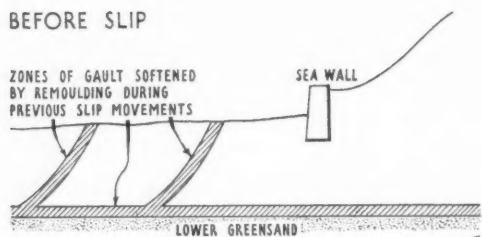
Radar is in use on railway owned ships, but no attempt has been made to apply it to railway working in the ordinary sense. None of these managements has any railway television. There is a natural conservatism in introducing novel methods, often requiring the recasting of instructions and habits of working, but competition from other means of transport is compelling railways to consider every possible source of giving better service with increased economy. The report concludes with a technical section giving details of the types of apparatus in service on the railways covered by it.

Coastal Erosion Works at Folkestone Warren, Southern Region

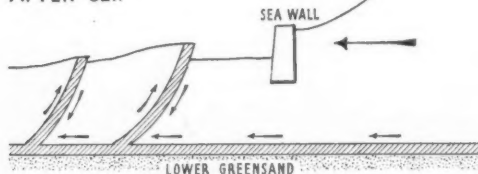


Plan showing the extent of the works carried out or in hand

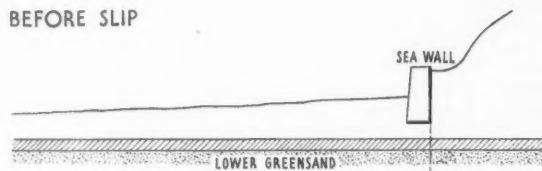
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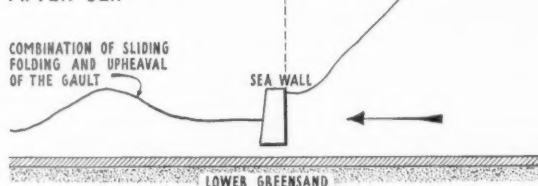
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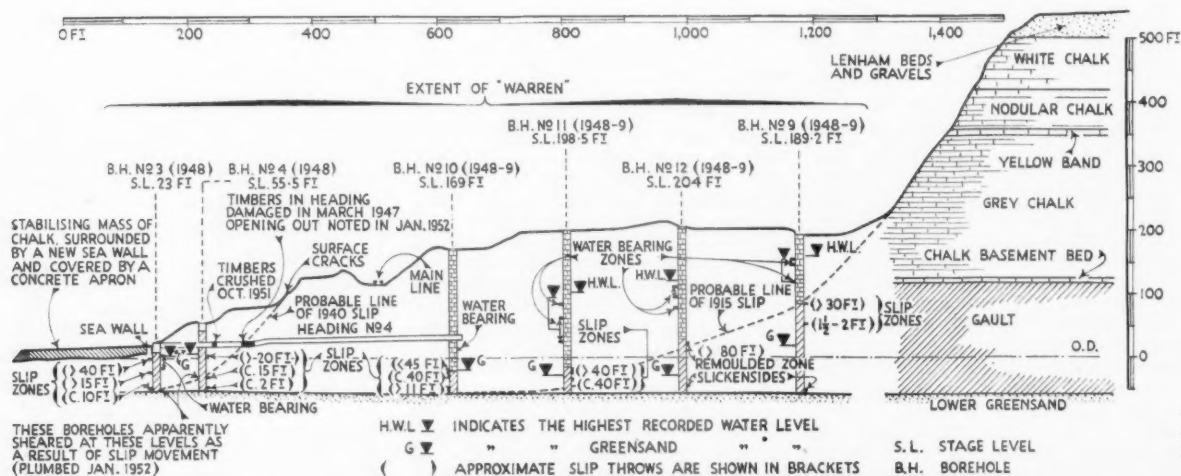
BEFORE SLIP



AFTER SLIP



Sections showing (left) mechanism of toe upheaval at the east end of the Warren, where the greensand is at some depth, and (right) mechanism of toe failure at the west end, where the greensand is nearer the surface



Section across the Warren showing exploratory boreholes and the slip surfaces

Coastal Erosion Works at Folkestone Warren

*Drainage and stabilisation
of extensive landslip area*



Work in progress on the foreshore The old seawall can be seen to the right and the new apron in the foreground

THE Southern Region main line between Folkestone and Dover crosses a two-mile long stretch of undercliff known as Folkestone Warren. The line was opened in 1844 and enters and leaves the Warren by tunnels in the chalk. The area is known to have been liable to extensive landslips for a very long time, the first recorded slip having taken place in 1765. There were eight recorded slips in the 19th century and that in 1877 interrupted railway communications for a considerable period. In the present century slips occurred in 1915 and 1936-37.

The 1915 slip was on a large scale and involved the greater part of the Warren in a bodily movement towards the sea. The maximum displacement was about 165 ft. near the centre of the disturbance. The railway line was closed to traffic and not re-opened until 1919.

Causes of Landslips

The causes of the landslips were not known until the Southern Railway sank deep test boreholes in the area in 1938 and commenced the application of soil mechanics tests. This work was undertaken after a slip in 1936-37 had moved the western third of the Warren lying between the railway and the sea a considerable distance forward, amounting to as much as 90 ft. at the western end. The work was continued in 1948-50 by the Southern Region, British Railways, and deeper boreholes were sunk between the railway and the cliffs.

The slips were found to be due to shear failure in the basement bed of the gault clay close to the top of the lower greensand. Rapid erosion must have

taken place at the toe of the slips, before a sea wall was built along the foot of the shore line cliffs, and this removal of toe weight was a major cause of movement. An additional cause was the high level of the water table at the back of the Warren. This created pressure which helped in moving the land towards the sea.

Attempts to lower this high water table had been made previously and a

system of timbered drainage headings running back from the top of the sea wall to varying distances into the slip had existed for many years. None of these headings were extended to the rear of the Warren and thus they could not intercept water from the high cliffs, which, with rain falling directly on to the landslip itself, forms the principal source of supply to the water table.

New Drainage Tunnel

It was calculated that any appreciable reduction of the water head would bring about consequent relief from pressure which would in turn improve the stability of the area to a marked degree. With this in mind, a new 6 ft. 6 in. diameter drainage tunnel was driven in 1952. This tunnel is lined with reinforced concrete ring segments and was driven by means of a shield. The geological structure encountered during the driving of this tunnel bore out the results of the previous tests and the principal accumulation of water was found in the mixed chalk and loam which had fallen from the high cliffs. The effect of the tunnel has been to lower the water table by more than 20 ft. at the back of the Warren in that area.

To assist in replacing losses caused by erosion at the toe of the slip, and to re-establish some of the stabilising weight necessary, large masses of material have been spread on the foreshore. This is protected by a concrete wall and the whole of the dumped material has been covered with concrete



The new 6 ft. 6 in. diameter drainage tunnel



Typical section of the new sea wall

for further protection. Checks made from time to time show that this treatment has prevented further movement in that area, but a slip to the east of the new works caused the production of a new scheme in 1950.

Additional investigations into the most suitable combination of sea wall and apron for this site were made at Queen's University, Belfast, using models in a wave tank.

Construction Work

The whole of the constructional work is being carried out by the Civil Engineer's Department of the Southern Region using direct labour, except that the new heading already described was constructed by Kinnear & Moodie Limited.

The works consist largely of the building of sea walls, which are, in some places, purely for protection against the action of the sea, but in others are designed to retain filling which will act as a stabilising toe weight. The walls for both purposes are of similar profile but the retaining walls are some 6 ft. higher than the others.

The most effective point at which weighting could be applied was selected as a result of the investigations which had been made and in 1948 large-scale works were put in hand. The area chosen was some 400 ft. in width and 200 ft. in depth. As a first step two arms of precast blocks were built out from the existing sea wall 400 ft. apart. These stood on an *in situ* concrete foundation. The blocks used were 6 ft. \times 3 ft. \times 2 ft. and weighed $2\frac{1}{2}$ tons each. This was the heaviest block which could be handled by the largest crane which could be brought to the site. The wall is some 14-16 ft. high and 12 ft. in depth. The crane was a tracked machine since there was at that time no road giving access to the Warren. The blocks were laid in bonded courses and were strengthened by vertical steel bars set in holes in the blocks coincident between adjacent courses. The whole was grouted with Portland cement. The wall adjoining

the arms at the seaward end was provided with a stepped seaward face.

Chalk Filling

A filter bed of shingle to carry off surplus water was laid in the rectangle formed and on this the main filling was tipped. The filling itself consisted of 43,000 cu. yds. of chalk which was excavated from an area near the main line. This was carried from the excavation site, some 100 ft. above sea level, by dumpers which tipped it into the enclosure. A protective covering of concrete was laid on the filling after consolidation, and consisted of slabs 24 ft. \times 8 ft. with expansion joints.

To minimise the effects of scour, and as a result of the wave tank experiments, it was decided that an apron should be constructed at the toe of the sea wall. This apron is formed in reinforced concrete and is anchored, at the seaward end, to a line of No. 3 Larssen steel piling. At the shore end it is bonded

into the foundation of the sea wall. The piling was driven by two British made "Johnson" D.1 diesel pile hammers. These hammers are self-contained and on their own frames, and in addition are light in weight. A Ruston Bucyrus No. 19 excavator was used to lower the hammer frames over the wall in this case and runners were made from old railway lines to enable them to be skidded along as required. Complete 8 ft. bays of reinforced concrete were cast at one operation in full profile, protection against the tide being provided by sheeting where necessary.

Later Works

Large scale operations were re-started in 1951, although a section of a new type of small wall had been built as an experiment in 1950 to protect the toe of the existing sea wall and had proved very successful, the design being adopted for use where protection against erosion only was required. All machinery and material for the new works was assembled on the foreshore, special ramps having been built to enable this to be done.

Bulldozer-drawn sleighs carry the pile-driving equipment and the driving of these piles in now the first operation to be undertaken, followed by the foundations of the block wall and then the wall itself. The type of filling, chalk on a shingle bed, is the same as that used for the 1948-50 works.

All concrete, both for block and other work, is being supplied from a central plant. Excavation is carried out by a mechanical excavator, assisted in clearing material away by a bulldozer. Blocks are laid by a crane-rigged 19 R.B. crawler excavator. The conditions under which the machinery works on the foreshore necessitates heavy maintenance work, and a depot for this purpose has been established



Extension of defence works eastwards, 1953-54



General view of the 1948 counterweighting measures

on the site. As the sea wall work is very little above low-water mark, there is constant tidal interruption and the working time in a tide

is only about four hours. The labour force engaged on this portion of the work is therefore obliged to operate on the basis of two tides in

a day, and is booked off duty in the waiting period. This method of working is varied by alternation with day work every other week.

SWEDISH ENGINEERS' VISIT.—By arrangement with the British Transport Commission, a small party of officers and workshops staff from the Royal Swedish State Railways recently visited the Derby and Swindon works of British Railways, and the Acton works of London Transport, in connection with a study which the Swedish State Railways have been making of workshops productivity. The party included Messrs. J. Frostberg, Chief Engineer, Notvikens Works; N. Norrman, Chief Engineer, Malmö Works; and A. Rolfman, Assistant Chief Manager, Workshop Department, Railway Board, Stockholm. Before leaving Britain for further studies in France and Germany, the Swedish party were guests at an informal dinner given on behalf of the British Transport Commission at the Charing Cross Hotel. Those present included: Messrs. H. Aidley, D. S. M. Barrie, and J. R. Hind, British Transport Commission; P. Armstrong, Assistant to Regional Staff Officer, Western Region; and

J. G. Bruce, Assistant Mechanical Engineer (Works), London Transport.

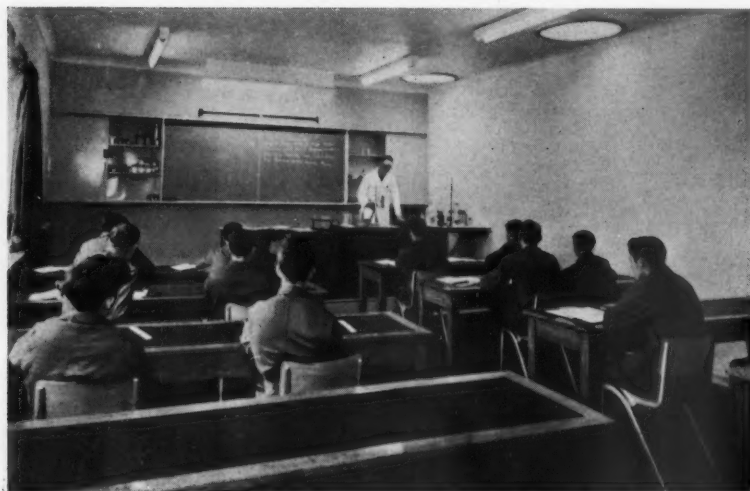
MINISTRY OF TOURISM.—The creation of a Ministry of Tourism to make full use of the tourist industry in bridging the gap between imports and exports has been advocated by Mr. A. J. Turner, Assistant General Manager (Administration) of Thomas Cook & Son Ltd. He was reading a paper on the British tourist industry at the annual conference of the Chartered Institute of Secretaries at Scarborough. The industry brought to Britain more American dollars than any other single industry, said Mr. Turner. The difference between currency spent by British people going abroad and currency spent by visitors to Britain was £55,000,000 in 1947. In 1952 it was down to £2,000,000 and the provisional figures for 1953 showed that the debit had been transformed into a credit of £2,000,000. Visitors in that year numbered 810,000 and they had spent

£125,000,000 in foreign currencies. From being the "Cinderella" of industries tourism had become the fairy godmother of the British nation, but tourism could only really flourish when all artificial barriers to free movement were drastically simplified.

MID-WEEK PERIOD RETURN TICKETS IN EASTERN AND N.E. REGIONS.—Commencing June 1, third class only mid-week period return tickets will be introduced, in both directions, between Kings Cross and Hull and certain stations in the West Riding, Tees-side, and Tyneside areas. They will be available by specified trains, outward and return, on Tuesdays, Wednesdays, and Thursdays, for 17 days from the date of issue and will be considerably cheaper than ordinary return tickets. The third class mid-week return fare between Kings Cross and Newcastle Central will be 45s. (against the ordinary return fare of 78s. 6d.; Kings Cross and Hull 40s. (55s.); and Kings Cross and Leeds Central 35s. (54s. 4d.).

Works Training School at Wolverton, L.M.R.

Fully equipped establishment for training apprentices at carriage and wagon works



Science lesson in progress in one of the classrooms

SHORTLY after nationalisation of the railways in January, 1948, Members of the British Transport Commission with the labour and establishment Members of the Railway and other Executives set up by the Commission visited Derby to inspect the Works Training School in operation; this school had been opened in 1947 by the London Midland & Scottish Railway. They were much impressed with all they saw and, after their visit, the Commission, in its report on staff training and education, recommended that the general pattern of practical and theoretical training at the school at Derby be developed and extended to the larger workshop centres of all the Executives wherever practicable.

Accordingly, schemes have been put in hand to cover all the main works of the London Midland Region, and these have included Wolverton as one of the most important carriage and wagon works in the country.

Demand for Apprentices

Apart from the importance of Wolverton as a railway centre, at which educational and vocational training facilities are both desirable and necessary, the shortage of trade apprentices was an additional reason for providing a works training school. Of a total personnel of nearly 3,800, Wolverton Works, with its relatively high proportion of skilled craftsmen, requires a normal complement of 450 apprentices, and this entails an average intake of 90 boys a year.

The conception of the Wolverton training school scheme and its subsequent development are the work of Mr. E. J. Larkin, Assistant Mechanical & Electrical Engineer, London Midland

Region; and the design of the building was carried out under the direction of Mr. J. Taylor Thompson, Civil Engineer.

The authority of the B.T.C. for the provision of a works training school at Wolverton was given in May, 1952. The main contractors have been the staff of Wolverton Works themselves, of which Mr. A. E. Peters is Works Manager. The school was opened on April 2 by Mr. J. W. Watkins, Chief Regional Manager, London Midland Region, as recorded in our April 16 issue.

The training school has been converted from what was formerly a laundry for the linen used in sleeping and restaurant cars. It is situated near the

main office building and occupies a prominent situation in the works. This ensures the closest contact between the training school and the workshops and brings a true workshop atmosphere into the school.

Equipment and layout

The training school comprises a large workshop on the ground floor and the main items of equipment are:—

6 woodworking benches	1 power hacksaw
1 woodworking planing and sawing machine	1 drilling machine
1 wood-turning lathe	1 smith's hearth with anvil
1 core oven	1 capstan lathe
1 crucible furnace	6 centre lathes
1 folding press	3 electrician's wiring panels
1 shearing machine	2 trimming benches
2 plate-rolling machines	1 painting bench
1 3-operator electric welding set	1 polishing bench
3 oxy-acetylene welding sets	1 painting fixture for coach panel sides
1 shaping machine	

The ground floor also accommodates the Chief Instructor's office, the Secretary's office, a reception office, and an amenities block. On the first floor are two large lecture rooms, each accommodating 24 trainees, an instructor's room, and a cinematograph projection room. One of the lecture rooms is fitted with a science desk to facilitate practical demonstrations and experimental work. An adjacent building will be used as a gymnasium when completed.

The accommodation is planned for upwards of 90-100 apprentice trainees at any time. The total floor space of the training school is some 10,000 sq. ft.

Intakes of apprentice trainees will conform to the leaving dates of the school's in the Wolverton area and will



General view of school workshop, showing some of the equipment in use

be three per annum. Accordingly, one-third of the total annual requirements of the works will be started each school term.

The training scheme will give preliminary practical and theoretical instruction to all apprentices upon engagement at the age of 15 for one whole year. Approximately two-thirds of the time in the school will be spent on practical and the remainder on theoretical work.

The practical work is divided into five main sections: (1) Joinery, coach finishing, patternmaking, and moulding; (2) plate and sheet metal work, coach bodymaking, electric and oxy-acetylene welding; (3) smithing, forging, fitting, and assembly; (4) electrical work, turning, and machining; (5) painting and signwriting, polishing, and trimming. Each section operates under the supervision of a workshop instructor.

In planning the curriculum for the theoretical work care has been taken to draw up a course which is complementary to the National Certificate courses and City & Guilds of London Institute courses undertaken by the Wolverton Technical College.

Provision is made for instruction in the following subjects the widely accepted school period of 45 min. being taken as the standard basis:—

	Periods
Workshop mathematics	4
Workshop science	3
Freehand sketching and machine drawing	2
Industrial history	1
Workshop theory	2
Industrial geography	1
Individual expression	2
First aid	1

It will be seen that 12 hr. a week are

spent in the lecture rooms on theoretical work.

At the termination of the 12 months course in the training school, the apprentice trainees will be transferred to the works and their training will be continued up to the age of 21. The training will follow a carefully planned schedule which guarantees every apprentice being given the same opportunity in accordance with the principles of the progressive system of workshop training which operates throughout the works.

Skilled Trades Taught

It is claimed that there can be very few works in Britain where such a wide variety of skilled work is undertaken and it has been necessary to plan the curriculum of the training school to include each of the following skilled trades:—

Brass finisher	Painter
Bricklayer	Patternmaker
Coach bodymaker	Riveter
Coach finisher	Sheet metal worker
Electrician	Smith
Fitter	Trimmer
French polisher	Turner
Joiner	Welder
Moulder	Wood machinist

The principal aims of the works training school are: (1) To introduce the boy to new conditions; (2) to acquaint him with the necessity for adapting himself to a new environment; (3) to give definite and systematic training in manual skill; (4) to ascertain his natural aptitude and thus try to place him in a trade in which he is considered likely to be successful; (5) to give class instruction on allied subjects and so widen the field of knowledge and

general outlook on life; and (6) to give him every encouragement to develop into a useful citizen.

Specialist Lecturers

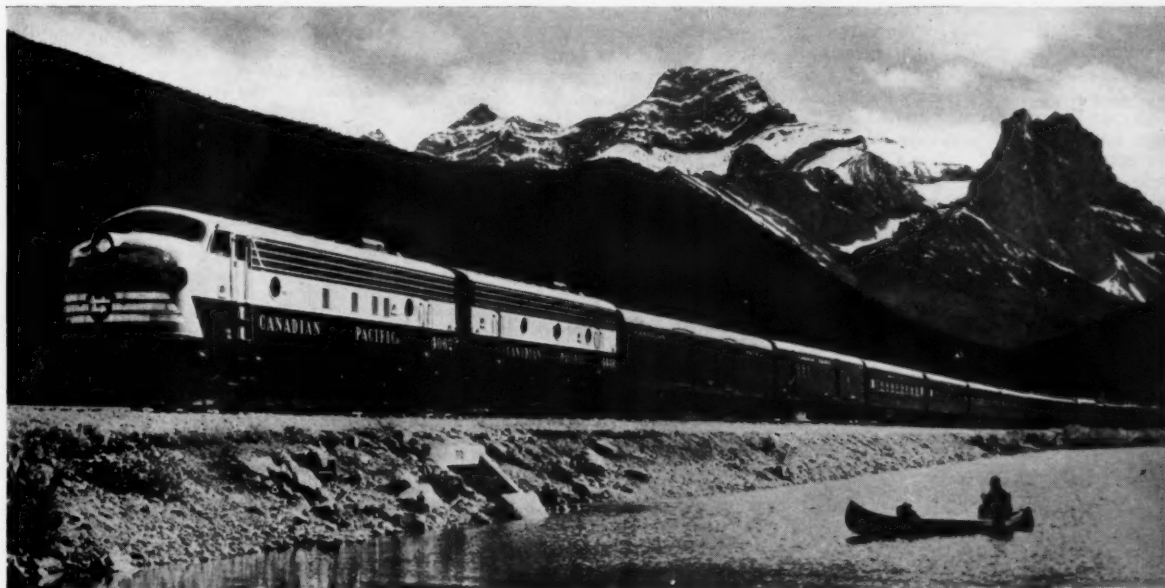
Spontaneous co-operation has been received from the Buckinghamshire Education Committee and the county authorities in the provision of specialist lecturers in certain general subjects. When the matter came before the committee, one member said that the scheme showed the greatest progress in technical education in his lifetime and he was pleased to know that Buckinghamshire could be regarded as pioneers in helping it along. It also made a much closer link between industry and the county authorities.

The main contractors, as stated, were the Building Department of the carriage and wagon works. The undermentioned specialist firms supplied equipment:—

Metal window frames	Henry Hope & Son Ltd.
Composition flooring	Macnab & Co. (Flooring) Ltd.
Sanitary fittings ...	Shanks & Co. Ltd.
Wall and floor tiling	W. B. Simpson & Sons Ltd.
Main entrance ...	Venesta Limited
Cloakroom fittings ...	G. A. Harvey & Co. (London Ltd.
Ironmongery ...	James Gibbons Limited

CLOSURE OF SWAINSTHORPE STATION TO PASSENGER TRAFFIC.—British Railways, Eastern Region, announce that from July 5 the passenger train service will be withdrawn from Swainsthorpe station. Facilities for passengers and parcels traffic are available at Florden and Norwich Thorpe stations and there are regular omnibus services operating in the area.

New Train for C.P.R. Transcontinental Services



One of the new trains placed in service by the Canadian Pacific Railway between Montreal and Vancouver, hauled by a 1,500-h.p. diesel locomotive. It is shown skirting the Bow River, in the Rockies

Breakdown Cranes for India

Steam-operated equipment for working on super-elevated broad and metre gauge track



Broad-gauge 65/40-ton crane at its extreme working height

AMONG the orders for railway equipment placed by the Indian Railway Board under the 1952-53 and 1954-55 rolling stock programme are a number of steam breakdown cranes. Orders were placed for seven of 75 tons capacity, five of 65/40 tons capacity, and 13 of 35 tons capacity, with Cowans, Sheldon & Co. Ltd., which firm has specialised in the production of this type of equipment for nearly a century. The cranes are allocated to the Western, Eastern, and Southern Railways, respectively.

The 75- and 65/40-ton cranes are designed for operating on the broad-

gauge and the 35-ton crane on the metre-gauge system. In the case of the broad-gauge cranes, the maximum permissible axleload in running condition is not to exceed 16 tons, and to achieve this with the 75-ton crane, relieving bogies are fitted, while the 65/40-ton crane is mounted on two six-wheel bogies. The metre-gauge crane has an axleload in running condition is not to exceed 10 tons, in this design also relieving bogies are fitted.

In keeping with the latest practice all cranes are designed for operating on super-elevated track. In the case of the broad-gauge cranes, stability allowance

has been made for a super-elevation of 5 in., and on the metre-gauge cranes 3 in.

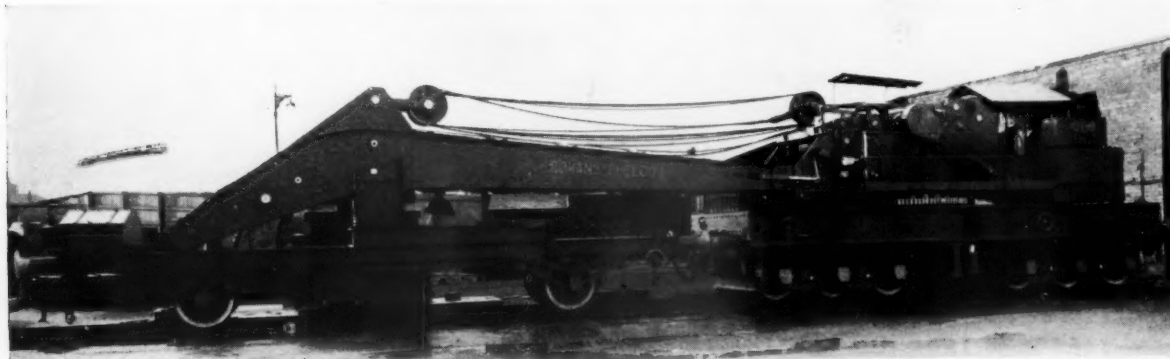
Steam is supplied on the broad-gauge cranes by Hopwood coal-fired boilers of the same dimensions—6 ft. 6 in. high by 4 ft. 6 in. dia. The working pressure is 140 lb./sq. in. A Hopwood coal-fired boiler is also fitted to the metre-gauge cranes, and is 6 ft. high by 4 ft. 6 in. dia. with a working pressure of 120 lb./sq. in. The engines, which are similar on both broad and metre-gauge cranes, have cast-iron cylinders 8 in. dia. by 14 in. stroke; Walschaerts valve gear is fitted in all cranes.

Hoisting Speeds

Hoisting speeds of the broad-gauge cranes are 75 ton crane, maximum lift, nine ft./min.; 35 tons at 18 ft./min.; 65/40 ton crane, maximum lift, 10 ft./min.; 40 ton lift, 15 ft./min.; auxiliary lift, 12 tons at 60 ft./min.; and six tons 90 ft./min.

The hoisting speeds of the metre-gauge cranes are—maximum lift 20 ft./min.; auxiliary lift, five tons at 120 ft./min. The slewing speeds of the broad and metre-gauge cranes are, one revolution in two minutes, and one revolution a minute, respectively.

RETIRED RAILWAY OFFICERS' SOCIETY.—The May ordinary meeting of the Retired Railway Officers' Society was held at the Railway Convalescent Home, Margate, on May 11, when 26 members assembled there under the chairmanship of Mr. C. B. Hassall, who is this year's President, and quickly disposed of normal business, to take full advantage of the weather and the cordial hospitality of their hosts, represented on this occasion by Mr. H. Haigh, Secretary of the Homes. After the party had inspected the premises, a pleasant afternoon was spent in the Home gardens and later, at tea. Mr. Hassall expressed great admiration for the organisation which continued to do so much for the good of railway staffs.



Cowans, Sheldon broad-gauge crane with match truck, for the Indian Government Railways

RAILWAY NEWS SECTION

PERSONAL

Sir Arthur Griffin, Chairman of Rhodesia Railways, will retire on May 18.

Mr. John Parker, District Engineer, Brighton, Southern Region, British Railways, has been elected a Member of the Institution of Civil Engineers.

The following are extracts from the Supplement dated March 2, 1954, to *The London Gazette* of February 26, 1954:—

REGULAR ARMY

The undermentioned officer to be Supernumerary to Establishment:—

Brig. (T/Maj.-Gen.) A. T. de Rhé-Philipe, C.B., O.B.E. (34389), late R.E., Jan. 14, 1954.

Corps of Royal Engineers

Lt. (War Subs. Capt.) A. W. W. Fitzgerald (237835) relinquishes his commn., Mar. 3, 1954, and is granted the hon. rank of Maj.

The following is an extract from *The London Gazette* of May 11, 1954:—

The Queen has been graciously pleased to make the following appointments to the Royal Victorian Order:—

To be a Knight Commander:—(To be dated April 21, 1954) Sir Oliver Ernest Goonetilleke, K.C.M.G., K.B.E.

To be a Member of the Fourth Class:—(To be dated April 21, 1954) Markandu Kanagasabay, Esq., O.B.E.

Mr. R. F. J. Surry, Assistant to Commercial Superintendent (Development), Waterloo, Southern Region, British Railways, has been appointed Assistant to Commercial Superintendent (Passenger), Waterloo, with effect from June 1, 1954.

INSTITUTE OF TRAFFIC ADMINISTRATION

The following national officers have been elected for 1954-55:—

President: Lord Merrivale of Walkhampton.

Vice-Presidents: Messrs. R. P. Bowyer, A. Lawes Cole, L. C. Harrison, C. J. Parker, B. R. Miller, E. H. Burn.

Chairman of National Council: Mr. F. N. White.

Vice-Chairmen of National Council: Messrs. T. Jackson, J. Foley Egginton, T. H. Carey.

Hon. Treasurer: Mr. L. C. Harrison.
Hon. Secretary: Mr. C. R. Griffin.

We regret to record the death on May 4, at the age of 72, of Mr. Albert Edward Leek. Until his retirement six years ago, Mr. Leek was General Manager of the Distington Engineering Co. Ltd.

Mr. Elliot F. M. Butler has joined the boards of the Antofagasta (Chili) & Bolivia Railway Co. Ltd. and of its subsidiary companies, the Aguas Blancas Railway Company, Andes Trust, and Chilean Northern Railway Company, following the retirement of Mr. Charles Cowley.

Mr. B. Arora, B.Sc., Senior Deputy General Manager, North Eastern Railway, India, who, as recorded in our May 7 issue, has been appointed General Manager of the system, was born in 1904 and educated at Kanpur and Allahabad. After obtaining his degree he was recruited as an Assistant Traffic Superintendent through open competitive examination and joined the Eastern Bengal Railway in 1927. He became a District Traffic Superintendent

In April, 1952, he became Senior Deputy General Manager of the newly-formed North Eastern Railway.

Mr. C. G. Bunker has been appointed Freight & Passenger Agent, Dundee, Canadian Pacific Railway, with effect from May 1, this year.

Mr. V. J. Faulkner, Publicity Manager of Crompton Parkinson Limited, has been elected Chairman of the B.E.A.M.A. Publicity Committee. Mr. C. H. Alsop, Publicity Manager of W. H. Allen Sons & Co. Ltd., has been elected Vice-Chairman.

Mr. J. R. C. Boyce has been elected President of the British Oil Burner Manufacturers' Association Limited, and Mr. J. D. Fitzgerald and Mr. F. C. Pillinger have been elected Vice-Presidents.

Mr. F. N. Lloyd, Chairman & Managing Director of F. H. Lloyd & Co. Ltd., has been elected Chairman of the British Steel Founders' Association, succeeding Mr. T. H. Summerson.

Mr. R. T. Priestman, Managing Director of T. J. Priestman Limited, has been elected President of the Aluminium Development Association for 1954-55. Mr. R. D. Hamer, President of the Association for 1953-54, is the new Vice-President, and Mr. Harold Goodwin was appointed Chairman of the Executive Committee of the Association in succession to Mr. G. W. Lacey.

Lt.-Colonel Claud Hardie, D.S.O., Joint Managing Director of Tyer & Co. Ltd. and B.P. & Tyer's Signals Limited, has resigned. He is retaining his seat on the board of both companies as Technical Director.

Mr. D. S. Bennett, Managing Director of both companies, has been appointed to the boards of P.A.M. Limited, Merrow Siding, and Resinoid & Mica Products Limited.

Mr. A. S. Mansell, Sales Manager, R. & A. G. Crossland Limited, has been elected a Director of the company.

Mr. Wilbur G. Boyd has been appointed Associate Commission Counsel, Canadian National Railways, succeeding Mr. Alex H. Hart, who becomes Special Assistant to the Vice-President of Traffic.

Mr. W. Ord, who is a representative of agriculture, has been appointed to be a member of the Transport Users' Consultative Committee for the North Eastern Area.

Mr. E. J. Mattocks, Rates & Charges Assistant, Commercial Superintendent's office, Waterloo, Southern Region, British Railways, has been appointed Assistant to Commercial Superintendent (Freight), Waterloo, with effect from January 1 of this year.



Mr. B. Arora

Appointed General Manager,
North Eastern Railway

in 1933 and was subsequently appointed Statistical Officer, Eastern Bengal Railway. In February, 1942, Mr. Arora was selected for the post of Deputy Director, Statistics, Railway Board, New Delhi. On the commencement of post-war planning work on the Indian Railways he was posted as Officer on Special Duty (Post-War Reconstruction), with the rank of Joint Director. In 1946 he returned to the Bengal Assam Railway as Deputy Chief Commercial Manager, and, later, Deputy General Manager (Personnel). On the eve of partition in July, 1947, Mr. Arora was appointed Transfer Officer (India) at Calcutta and was responsible for the absorption of about 22,000 of India-opting railway employees working on the railways constituted in Eastern Pakistan. This work was unprecedented in nature and had to be completed in about six months. On the termination of this work he was transferred to the Railway Board as the Director of Traffic. In June, 1948, he was appointed Chief Administrative Officer, Assam Railway.



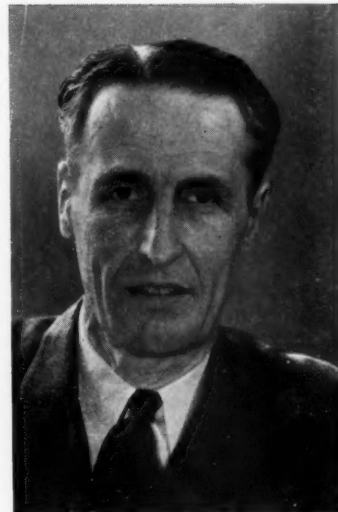
Mr. G. E. Woodhead

Appointed District Engineer, Derby (South),
L.M. Region



Mr. E. J. M. Matheson

Appointed District Engineer,
Glasgow (North), Scottish Region



Mr. H. M. Mathews

Appointed Director of Engineering,
English Electric Co. Ltd.

Mr. Geoffrey Edwin Woodhead, A.M.I.C.E., A.M.I.Struct.E., Fellow of the Permanent Way Institution, and formerly Maintenance Assistant at Euston Headquarters, London Midland Region, British Railways, who, as recorded in our May 14 issue, has been appointed District Engineer, Derby (South), was educated at Watford Grammar School and St. Paul's School, London. On leaving school in 1923 Mr. Woodhead spent three years with quarry and contracting firms and at the School of Building, Brixton, London. He joined the former London Midland & Scottish Railway as a Draughtsman in the District Engineer's office, Watford, in 1926, and was subsequently closely associated with the re-modelling of Camden Locomotive and Goods depots. In May, 1936, he was transferred to headquarters at St. Pancras as a draughtsman in the Structures Section. In 1937 Mr. Woodhead was appointed Assistant Resident Engineer (Bridges) at Manchester, and was responsible for carrying out the reconstruction of a considerable number of steel bridges. In 1940 he was appointed Resident Engineer (Bridges) at Manchester and during the war carried out a large amount of repair work covering the whole of the London Midland & Scottish Railway system south of the Scottish border. Mr. Woodhead was appointed Assistant District Engineer, Derby (South), in 1945, and while in this post acted in the capacity of District Engineer both at Derby (South) and Nottingham. In 1951 he was appointed Works Maintenance Assistant at Euston Headquarters, and for a considerable time acted as Assistant Engineer (Works Maintenance). His new appointment dates from April 12, 1954.

Mr. E. J. M. Matheson, E.R.D., B.Sc. (Eng.), A.M.I.C.E., A.C.G.I., Assistant District Engineer, Sheffield, Eastern Region, British Railways, who, as recorded in our May 7 issue, has been appointed District Engineer, Glasgow (North), Scottish Region, was educated at St. Paul's School and the City & Guilds (Engineering) College, London. On entering the service of the Great Western Railway in 1933, Mr. Matheson was employed on permanent way and new works design

in the office of the Chief Engineer, until, in 1937, he became Assistant Resident Engineer on the extension of the Central London Line between North Acton and Greenford. In the following year he was appointed Resident Engineer in connection with quay wall construction work at Weymouth. On his return from service with H.M. Forces, Mr. Matheson took up an appointment under the Divisional Engineer, Taunton, and in 1946 became Plant Assistant to the Chief Engineer, Paddington. In the following year he was transferred to the staff of the Divisional Engineer, Paddington, where he later became Senior Assistant. In 1949, under British Railways, Mr. Matheson was appointed Assistant District Engineer, Sheffield, and in this position gained considerable experience in civil engineering work relating to main line railway electrification. During the 1939-45 war Mr. Matheson served with distinction in the Royal Engineers on railway and dock construction, and attained the rank of Lieutenant Colonel; he now commands 136 Construction Regiment of the Army Emergency Reserve.

Mr. H. M. Mathews, C.I.E., M.I.E.E., who, as recorded in our April 23 issue, has been appointed Director of Engineering, English Electric Co. Ltd., responsible for co-ordination and direction of the technical policy of the company, was born in 1903 at Alverstoke, Hants. He received his early education at the Wells House School, Malvern, Wells, and Cheltenham College, before proceeding to Faraday House for his electrical engineering studies. Mr. Mathews was with the City of Winnipeg Hydro-Electric System from 1924-26. From 1927-41 he was on the staff of Merz & McLellan, first as representative on the construction of the Kalyan Power Station in India, then as representative in Canada, and, from 1933-40, at the London office of the firm. During this time he travelled extensively abroad, completing visits to India, South Africa and the Gold Coast. From 1941-48 Mr. Mathews was the Electrical Commissioner with the Government of India, and, from 1945-48, he was also Chairman of the Central Technical Power Board in India. He was created a C.I.E.

in 1944. Mr. Mathews joined the English Electric Company in 1948 as Adviser to the Chairman & Managing Director, on whose behalf he has since travelled extensively on the company's business mainly in Australia, Africa, the U.S.A., India and Turkey. He is a member of the Institution of Electrical Engineers and a director of the English Electric Export & Trading Co. Ltd.

Mr. G. A. Steel has retired from the board of the British Aluminium Co. Ltd.

C.A.V. Limited announces the appointment of Mr. A. W. Reed as Sales Manager (Operators).

We regret to record the death on May 4 of Mr. J. E. L. Smelter Young, M.I.Mech.E., M.I.Loco.E., Founder and Chairman of the Tempered Spring Co. Ltd.

Mr. Charles Sinclair, Sales Executive, Dunlop Rubber Co. Ltd., is retiring at the end of this month after completing 50 years of service in the industry.

Mr. K. A. Ballard has been appointed a special representative for steel castings for Samuel Osborn & Co. Ltd. He will be attached to the company's London Office.

Mr. S. A. Roberts, General Manager to the B.S.A. Tools Group, has been appointed to the board of the following companies of the Group: B.S.A. Tools Limited, Leo C. Steerile Limited, and Cardiff Foundry & Engineering Co. (1947) Ltd.

PUBLIC ADDRESS SYSTEM INSTALLED AT LANCASTER CASTLE STATION.—To help passengers find their train connections at Lancaster Castle Station, British Railways, London Midland Region, have installed a new public address system. It was first heard in full operation over the Easter holidays. The installation consists of three amplifier units serving five loudspeaker circuits, and a total of 51 loudspeakers.

Ministry of Transport Accident Report

Granton Harbour Branch, April 24, 1953; British Railways, Scottish Region

Mr. J. L. M. Moore, Railway Employment Inspector, Ministry of Transport and Civil Aviation, inquired into the accident which occurred at 10.0 p.m. on April 24, 1953, on the Granton Harbour branch line when the 4-4-0 engine No. 62421, travelling tender first, collided violently with 0-6-0 tender engine No. 64528, standing about 400 yd. from the entrance to the yard at the far end of the line. This engine had the hand brake fully applied and two 20-ton brake vans attached to the tender with at least one brake on. It was forced forward 50 yd. and collided in turn with the rear of a stationary train consisting of a brake van and 29 loaded coal wagons with some brakes pinned down for the falling gradient. There was considerable damage to the engines and two brake vans were telescoped. Two wagons were derailed and others buffer locked. Flying debris damaged a motor car and broke a hotel window. The driver of the standing engine was buried under coal, dying before he could be released, the guard in the leading brake van was fatally injured, and the driver of the colliding engine so badly injured that Mr. Moore was unable to question him for nearly five months. The firemen escaped with slight injuries. Ambulances were summoned by the hotel staff and valuable assistance rendered by railway staff. The down line was cleared by 5 a.m. The up was at no time affected.

Method of Working

The branch is double and forms a goods line extending for three miles from Easter Road Junction, falling for the most part and culminating in 1,210 yd. of 1 in 100 down to the harbour. The signal boxes open were Easter Road Junction and Trinity Junction, 1 m., 1,100 yd. along the branch, between which there is absolute block working; thence the line is worked as a yard with bell communication to the foreman's cabin for train description. The regulations lay down that "trains must only be run at such speed as will permit them to stop clear of any obstruction" and that speed at Trinity Junction and station must not exceed 15 m.p.h.

The signalman at that junction does not have to get acceptance from the yard nor is he informed whether trains are taken into it immediately or detained on the running line and has no knowledge of the position when clearing his starting signal. It has become usual for some signalmen to warn drivers when two or more trains have preceded them in quick succession which, though well meant, is entirely irregular and misleading, especially as practice differs among the men. One signalman who had worked many years in the box said he never gave such warning. On this occasion none was given to the colliding engine, which passed at 9.57 p.m. The coal train had entered the section 1½ hr. previously, followed by the engine propelling the two vans at 9.48. The signalman was unaware that the former was still on the branch. The yard has a distant signal fixed at "caution", and a home signal worked from a ground frame, mainly to protect a crossover and commonly at "clear." This frame and another control a number of points but there is no interlocking. From Easter Road

Junction to the point of collision is 2 m. 780 yd. The driver of engine No. 62421 took over at St. Margaret's Motive Power Depot, with a fireman strange to him who had never been down the branch in daylight and only once at night two years before. He had to reverse two or three times before getting to the branch and was quite satisfied with the action of the brake. He said he had a clear run down the branch, with steam shut off most of the way, and passed Trinity Junction at 25 m.p.h. Absence of any indication from the signalman did not influence his actions. He knew he had to be prepared to stop short of anything. He had reduced the speed to about 20 m.p.h. on emerging from a short straight tunnel that follows the junction. At a point where, after 250 yd. of straight track in cutting, the line runs into the open and round a 13½ ch. left-hand curve on low bank and starts its final 1 in 100 descent, he asked the fireman if the line was clear and was told it was. Later he said more pointedly "Do you see anything yet?" and the reply was "Yes there is a van away down." He, himself, saw no red light but almost at once noticed the form of an engine chimney looming an engine-length-and-a-half away and made an emergency brake application but the wheels locked. The fireman said he specifically mentioned a van as the light seemed to him too high to be on a buffer beam, the usual place for an engine tail lamp. It was 50 to 60 yd. away when he first saw it.

Travelling on the repaired engine, with another at the point of collision with two vans beyond and the same arrangement of lights as on the night of the accident, Mr. Moore found that road lights, following the course of the railway closely on the left after the cutting, interfered considerably with the detecting of the red tail lamp, which was in the centre of the engine buffer beam. It was nevertheless visible over the top of the tender from either side at 330 yd. but obscured at about 40 yd., by which time, however, the profile of the chimney and top of the smoke-box could be seen against the glow of the street lamps. The track being several feet above the street made the buffer beam lamp appear higher than it was, justifying the fireman's first impression that it was a van side lamp. Actually the one on his side of the van never came into view from the footplate as the vehicle was just on a slight curve to the right. The light he saw must have been the tail lamp smashed in the collision but seen by Trinity Junction to have been giving a good light 10 minutes earlier. The driver's failure to see it is difficult to understand and the only explanation appears to be that he was relying on the fireman instead of keeping a lookout. The only advantage the fireman has on the left of the footplate in the direction of travel, is seeing across the chord of the prevailing left-hand curve more readily. The driver must look over the top of the tender unless he crosses over. Nevertheless, curvature is variable in direction and radius and intimate knowledge of the line is essential at night to ensure looking in the right direction and picking out at first opportunity the glimmer of a red lamp amongst the brighter street lamps. This should have been easy for the driver, thoroughly

familiar with the line, but to rely on the fireman showed a poor conception of his sense of responsibility. His primary mistake, however, was his speed. He seemed to be under no misapprehension about being prepared to stop short of any obstruction. Opinions on the speed varied considerably and were clearly unreliable, but Mr. Moore has little doubt, from the damage done, that it could have been little, if anything, less than 40 m.p.h., in which case had the lamp been noticed at the first opportunity the collision could not have been avoided. Surprisingly the driver did not consider it excessive and made no complaint against the brakes, which were proved to be in order. Exceptional speed, however, was not confined to this section. Train bookings showed the engine covered just under two miles in two minutes from Easter Road Junction to Trinity Junction. The average for six other light engines was between six and seven.

Conclusion

The driver had an entirely distorted idea of speed that night, but Mr. Moore could not obtain evidence of anything to account for it. He had no domestic worries and appeared to be in his usual state of health. He had a clear record throughout his 27 years railway service, except one occasion of absence without permission and being held responsible for a derailment in shunting, but he was grossly negligent in this instance, both as regards speed and failure to keep a lookout, where extreme caution was required. The fireman might have seen the red lamp sooner, but should not be blamed in the circumstances. He is 22 with a clear record during three years service broken by military service. Mr. Moore is satisfied he was looking out to the best of his ability but perhaps concentrating attention in the wrong direction.

Remarks

Low speed and a close lookout are essential to safety on this line at all times, made clear by instructions, and the misleading practice, above referred to, adopted by some signalmen has been stopped. While there was no excuse for the driver's behaviour, Mr. Moore thinks it undesirable that a train should be admitted to a section of this character by fixed signal set at "clear" from the moment of coming in view. The driver should receive some reminder locally of the change of method of operation. It is recommended to stop or severely check trains at Trinity Junction starting signal to ensure entering the section dead slow.

WANTON DAMAGE TO ROLLING STOCK.—Some youths travelling on the 11.25 p.m. return excursion train from Blackpool to Stockport on May 8 caused considerable wilful damage to the interiors of five of the coaches. These have had to be taken out of traffic for repair. Nearly 100 electric lamps were broken, electric fittings damaged, wood panelling smashed, coat racks, hooks and towel racks torn down, and upholstery burnt. British Transport Commission Police are investigating the matter.

Institution of Railway Signal Engineers

Mr. J. H. Fraser's presidential address

The annual general meeting of the Institution of Railway Signal Engineers was held in London on April 14, with the retiring President, Mr. T. Austin, in the chair at the opening of the proceedings. Mr. Austin reviewed the main features of the Council's report for 1953, and referred to the increase in membership, caused largely by introduction of the class of technician member. The affiliated signal and telegraph societies, he said, continued to progress and increase. A wide variety of papers had been read at the Institution's technical meetings and the discussions on them had been entirely satisfactory.

Mr. B. Reynolds, Hon. Treasurer, drew attention to increases in the accumulated fund and in investments. The report and accounts were formally adopted.

Mr. Austin then presented to Mr. D. R. Turner the prize for the best paper read before the Institution in 1953, on interference from electric power lines and traction circuits, and to Mr. F. Horler the second prize for his paper on layout of signal cabins.

The composition of the Council for 1954 was announced by Mr. Austin as follows:

President, Mr. J. H. Fraser; *Vice-Presidents*, Mr. E. G. Brentnall and Mr. J. C. Kubale; *Members of Council*, Messrs. F. Burton, J. S. S. Davis, C. G. Derbyshire, F. B. Egginton, R. A. Green, F. G. Hathaway, W. Owen, D. G. Shipp, J. F. H. Tyler, A. F. Wigram, B. H. Grose, O. H. Hoffman, M. Le Sueur, F. Mann, A. L. Mills, and R. A. Powell.

In due course, it was stated, a number of Past-Presidents would be co-opted to the new Council.

The chair was then taken by Mr. Fraser, after which a vote of thanks was awarded to Mr. Austin for his services as President during the preceding session.

Automatic Train Control

Mr. Fraser opened his inaugural address, which was illustrated with lantern slides, by remarking that the ultimate purpose of the Institution was to deal with the control of trains, and that, therefore, the question of A.T.C. was of special interest to its members. It differed from every other signalling problem in that it involved effecting connection between train and track, something moving and something stationary.

Various classes of apparatus had been proposed for the purpose, he added, the simplest of which were mechanical; but these possessed various disadvantages such as exposure to ice and snow and other adverse weather conditions, besides the necessity of being able to withstand shocks at speed. They also added load to the signals, but had proved satisfactory for stop signals on electric lines, when power operated. Special moving arrangements were necessary with them.

Electrical contact devices were the next simplest, with no moving parts or difficulty from shock. Such a system had been long used in France, but had some weaknesses, the chief being that it worked on an open circuit; but combined with certain precautions and the use of a vigilance record on the speed indicator band, the chances of even a single signal indication being missed was remote. The driver was thus compelled to acknowledge receipt of a signal indication, adverse or otherwise.

The electro-mechanical class of apparatus was represented here by the G.W.R.

equipment in which electrical action on a closed circuit was used for the "clear" indication, and "warning" by mechanical action from a fixed track element, adding no load to the signals. There was, however, the difficulty of encroachment on the clearance space between running and structure gauges, which rendered such equipment unsuitable where electric stock ran; this might increase with the development of certain types of electrification.

The third type operated without any contact between train and track, the air gap being bridged by induction, electrical or magnetic. Mr. Fraser said that this eliminated weather influences and enabled a "continuous" system to be constructed by using the rails to transmit the message to be picked up on the train. This last was a very attractive idea, but necessitated a considerable increase in the amount and complexity of apparatus, including complete track circuiting throughout. Its great disadvantage was economic; unfortunately that was an overriding one. The question of whether some additional security was worth its cost to the travelling public had always to be kept in mind.

In America and on the Continent, intermittent inductive action had been employed with success to give several degrees of warning and even act on the brakes to control the speed within prescribed limits. Any power required was carried on the train; there was none beside the line. There was, however, an inherent weakness, in that the circuits did not completely prove themselves. By using a permanent magnet in conjunction, this could be obviated. The system now being subject to trials on British Railways, which gave "warning" and "clear" signals, used a permanent magnet to initiate the action, cancelled if the signal was at "clear" by an electromagnet, working over a 5-in. air gap. (The working was fully described during the address.)

Visual and Audible Indications

An important part of Mr. Fraser's remarks concerned the question of how best to utilise the effect once it was transmitted to the train, and discussed the advantages and disadvantages of visual and audible indications, the latter being generally preferred, except with "continuous" systems. Control over the brakes also involved many factors, especially where "warning" indications were concerned. Some systems, he pointed out, went so far as to include additional locations between distant and stop signals and enforce suitable speed reductions, but for practical and economic reasons they were not favoured in Great Britain.

Cancelling and Forestalling

Turning to the cancelling and forestalling features of these arrangements, Mr. Fraser stressed their weaknesses and the suspicion felt for all cancelling devices by signal engineers. They offered a much greater problem in A.T.C. than with other signalling controls. Faults, technical and operational, could occasion false assumptions of failure, he added, which could react adversely.

Difficulties also arose from the type of semaphore working used in this country. It was necessary to avoid cancelling actions becoming habitual and passing unnoticed. To counter this the new British equipment incorporated a special indica-

tor, to give a constant reminder, until the next signalling location was reached, that a warning had been received and cancelled.

Operational Aspects

Dealing with the operational sides of the problem, Mr. Fraser pointed out that there were two: to help the driver to fix his location and to tell him when to reduce speed or stop. The first could be secured by a mere approach location warning, but little more expense was involved in going a step farther. On main lines, emphasis was placed on the "caution" signal; this was the principle followed here. By giving also a "clear" indication, the advantages of a location sign were obtained at all times and proof at each point that the equipment was operative. The subject of A.T.C. was one which many might not have looked at in a general way. It was likely to assume increasing importance in British signalling.

Replacement of London Transport Trolleybuses

It has been announced by London Transport that the electric trolleybus fleet (with the exception of a small number in the South-West suburbs) is to be replaced by diesel oil buses of a new lightweight type, beginning in about three years time.

All London trolleybuses, except those in one area, it is stated, will have completed their useful lives in a few years time. It has been decided that the best vehicle for replacement will be an oil bus of a new type. Two prototypes of the new design are expected to be under test before the end of the year. The conversion of the trolleybus routes to oil buses will involve some 1,600 vehicles, twice as many as in the south London tram conversion. It is claimed that buses are more mobile in traffic, can maintain a more even service, and are more flexible in operation, so that route extensions and diversions can be made where needed and services switched to new areas.

New 64-Seater Bus

The new bus to replace the 70-seater trolleybus is designed to seat 64, and will be 8 ft. wide, 6 in. wider than most of the present London buses. It will have a lightweight aluminium body, and although it will take eight more passengers than the present London "RT" bus, it will weigh no more with a full load. Traffic requirements will be fully met with the 64-seater bus, despite its lower capacity.

The trolleybus conversion, like the tram conversion, will take place in stages. The changeover probably will be carried through at week-ends and there will be no interference with public services. The full capacity of London Transport power stations will become available for other needs, mainly on the Underground.

ASSOCIATED BRITISH ENGINEERING LIMITED: CHANGE OF ADDRESS.—The address and registered offices of Associated British Engineering Limited now are at 9/10, Cavendish Square, London, W.1. The London sales office of the following companies of the Associated British Engineering group of companies will also be at the foregoing address:—The Bergius Co. Ltd., Henry Meadows Limited, H. Windop & Co., Ltd., A. C. Morrison (Engineers) Limited. The telephone number is Langham 8351/3.

Beyer, Peacock & Co. Ltd. Annual Meeting

*Centenary year of the company:
Mr. Harold Wilmot on the outlook*

The annual general meeting of Beyer, Peacock and Co. Ltd. was held on May 19 in London. Mr. Harold Wilmot, C.B.E. (Chairman & Managing Director) presiding.

The following is an extract from his circulated review:—

The consolidated balance-sheet shows a liquid balance of £2,108,476 as compared with £1,191,676 at the end of the previous year. It is, perhaps, not inappropriate that in the hundredth year of trading total sales and total gross profits should both have reached new record high levels.

Beyer Peacock locomotives still enjoy an unrivalled reputation throughout the world. It continues to be our ambition that the name of the company shall be synonymous with all that is best in design, materials, and craftsmanship. Competition is getting keener and in my opinion will continue to do so for some time. We believe, however, that apart from some convulsion in world economy, a steadfast devotion to our engineering ideals, coupled with unremitting zeal in the study of our customers' operating conditions and requirements, will ensure an adequate flow of high grade business to our company. Present locomotive orders will provide continuity of production at present load for over two years.

Year of Progress

During the year under review considerable progress was made by our subsidiary companies.

At the end of the hundredth year of trading, shareholders may like to know that the board has had a professional valuation of all the land, buildings, plant, and machinery belonging to the Group. In the consolidated balance sheet these assets, exclusive of loose tools, and so on, stand at £1,471,015 gross, less depreciation reserves of £563,797, that is £907,218 net. The valuation recently completed shows a figure at December 31, 1953, of £2,301,397

as compared with the foregoing net amount.

As foreshadowed in last year's report, your board considered it appropriate to make a rights issue of ordinary shares. This issue, made in September, was well received by shareholders and was considerably oversubscribed. 566,667 ordinary £1 shares were issued at a price of 27s. 6d., bringing the total capitalisation of the company to £1,500,000—£1,200,000 ordinary and £300,000 preference. In an endeavour to preserve some measure of equity as between old and new shareholders an interim dividend of 4 per cent was paid prior to the new issue. This early date for an interim dividend is not likely to be repeated.

For reasons which were stated in my last review, the board now consider it appropriate further to increase the authorised capital of the company for which purpose a resolution has been included in the notice calling the annual general meeting.

History Reviewed

There are a few important dates in our company's history. The founding of the partnership of Charles Frederick Beyer, Richard Peacock, and Henry Robertson in 1854, the formation of the public limited liability company in 1902, the invention of the Garratt type of locomotive articulation in 1907, armament production during the war period of 1914-18, the grouping of British Railways in 1923, the great depression of 1931-34, the period of expansion (new products by subsidiary undertakings) 1932-53, the second world war 1939-45, the nationalisation of British Railways in 1948, our association with Metropolitan-Vickers Electrical Co. Ltd. on electric and diesel-electric locomotives from 1950 to date. Through it all we have preserved a certain character—the spirit of industrial adventure and a devotion to quality in design and workmanship. In

common with most old companies we have had our patches of glory and our periods of frustration and eclipse.

At the close of our century, the company is at least as strong as ever in its history. This is the result of the continued support of shareholders who have provided the necessary risk capital, and of the devoted and competent service of the company's employees of all grades. We therefore face our second hundred years in good heart, with firm resolve, and with justifiable confidence.

The report and accounts were adopted and the proposed final dividend of 3½ per cent plus a bonus of 8½ per cent, making 16 per cent, less tax, for the year, were approved, and the resolution increasing the capital was sanctioned.

New Staff Hostel at Peterborough

A new staff hostel for railwaymen has been opened at Peterborough by British Railways, Eastern Region, with a view to solving housing difficulties occasioned by accommodation difficulties in the district. The building provides individual rooms for 40 persons, but is capable of extension to house 80 should the need arise.

Of single storey construction, the hostel is planned with the public rooms around the entrance hall and the sleeping accommodation in cubicle wings away from these rooms so that those sleeping during the day are not disturbed. The cubicle corridor ceilings are acoustically treated to ensure quiet.

Staff Facilities

The dining room and kitchen are equipped with all modern appliances and a games room with a billiards table and table tennis is provided, besides a "quiet room" and a hobbies room. Full washing facilities are available, and provision has been made for men wishing to wash clothes.

A grass space at the rear of the hostel, sufficiently large for a football pitch, caters for outdoor recreation.

The contractors responsible for carrying out the work are John Wilmott & Sons (Hitchin) Ltd.



The new staff hostel at Peterborough showing the dining room and (right) the games room

Institution of Locomotive Engineers Summer Meeting

The summer meeting of the Institution of Locomotive Engineers was held on May 13-14. It opened with a visit to Crewe Locomotive Works, members being conveyed by special train from London. Altogether the party consisted of some 120 members and guests, those from the mid-land area joined the party on arrival at Crewe. A conducted tour of the works was undertaken when the visitors had an opportunity of seeing much of the progressive system installed for the repair of locomotives, some 30 of which are turned out each month.

Tour of Works

The tour included the steelworks where the visitors saw the casting of locomotive steel centres, cylinders, and other cast-steel components. The melting plant consists of two pulverised fuel fired Sesci rotary-type furnaces rated at five tons, said to be the only furnaces of this type used for steel in this country. Normal output of castings is approximately 60 tons a week. The main machine shops were also included, where the visitors were given the opportunity of seeing the production of numerous locomotive components in which the latest methods are employed including the profile machining of various components.

The tour also included the iron foundry and the forge and smith shop, which supplies heavy forgings for repair work at Crewe, Derby, Horwich, and St. Rollox. The average weekly output is some 16 tons. Other shops visited included the wheel shop, boiler shops, and the locomotive assembly shops, where assembly is carried out on the belt system. During 1953 some 1,688 locomotives were repaired and 27 new locomotives built.

On completion of the tour of the Crewe works members and guests were conveyed by special train to Chester where the Institution dinner was held at the Grosvenor Hotel, the chair being taken by Mr. R. C. Bond, President of the Institution, who expressed the thanks of the members and guests to the committee responsible for the arrangements, of which Mr. J. F. B. Vidal was chairman, and to Mr. G. T. Hart, Secretary, and Miss J. M. Johnson, Assistant Secretary of the Institution.

Hawarden Bridge Steelworks

John Summers & Sons Ltd. were hosts on May 14. The party travelled by road from Chester to Shotton where they were taken on a conducted tour of the Hawarden Bridge Steelworks of the company. The works is some 533 acres in extent, of which 75 acres are covered. Motor transport was arranged to convey the visitors to the various departments.

During the tour the visitors were given the opportunity of seeing the production of steel sheet from the receipt of raw materials, through the various stages of production, to the finished product. The tour included the coal handling plant, which carries a stock of 33,000 tons in three banks of 11,000 tons each, the loaded trucks being received in gravity sidings and handled by hoists over weighing tipplers.

Coal is conveyed to the coke ovens by belt-conveyor to two batteries each of 44 Simon Carves underjet ovens capable of carbonising some 12,000 tons of coal a week. Two complete sets of oven machines are installed, and are of orthodox design except for the fact that the four-hopper oven charging car is fitted with Locker-Traylor feeders to ensure even

flow of coal. By-products include tar, benzol, and sulphate of ammonia.

Other departments included the ore stock yard, which has a capacity of 220,000 tons of ore. The blast furnace, which has a diameter of 27 ft., has a weekly output of 7 to 8,000 tons of hot metal. Slag is removed after water cooling by a 1½ cu. yd. digger, and loaded into 12-ton Aveling-Barford dumpers, and used for land reclamation and so on. The steelworks has two hot metal mixers, each with a capacity of 1,200 tons, the sole purpose of which is to maintain the hot metal in molten state. There are eight, 150-ton fixed basic open hearth furnaces supplied by the Salem Engineering Company and the equipment includes four, eight-ton Arrol-Morgan floor charging machines, two, 125-ton Wellman Smith Owen cranes over the furnace bay, and two, 250-ton cranes by the same makers over the casting bay.

A special feature of the steelworks is the system of automatic control and instrumentation of the equipment installed by Tinsley (Industrial Instruments) Limited. Each furnace is provided with a control cubicle which houses the equipment, which includes Triplex recording instruments for the flow of oil, steam, gas, roof temperatures, and molten steel temperatures in the furnace. There are also indicators for the different pressures and temperatures necessary for correct working conditions. Four sizes of ingots are produced, 11½, 9, 7½, and 6½ tons respectively.

The visit concluded with a tour of the slab mill, hot strip mill, and coal reduction mill departments and the power house. The slab mill was built by Davy and United Engineering Co. Ltd. and installed in 1950. It is a 42 in. x 8 ft. reversing mill, and can handle ingots of a maximum size of 15 tons, which produces slabs of up to 55 in. wide by 7 in. thick.

The hot strip mill comprises eight stands, three rough and five finishing, built by the Mesta Engineering Company, Pittsburgh. The mills are driven by motors supplied by the English Electric Co. Ltd. There are two cold reduction mills, a four-stand tandem type, built by the Mesta Engineering Company, and a single-stand reversing mill, built by Davy and United Engineering Co. Ltd.

The visitors were entertained to luncheon by the Chairman and Directors of the company. Mr. R. C. Bond expressed the thanks of the Institution for a very enjoyable visit and Mr. R. F. Summers, Chairman of John Summers & Co. Ltd. responded suitably. Members were conveyed from Shotton to Paddington by special train where the meeting terminated.

Questions in Parliament

Iron & Steel Corporation Assets

Mr. Frederick Willey (Sunderland N.—Lab.) asked in the House of Commons on May 10 what percentage of the assets of the Iron & Steel Corporation had been returned to private ownership.

Mr. J. A. Boyd-Carpenter (Financial Secretary to the Treasury) stated in a written reply that the Holding & Realisation Agency had so far realised about 13 per cent of the book value of the securities in steel companies as taken over from the Corporation.

Supervision of Steel Companies

Mrs. Eirene White (Flint E.—Lab.) asked in the House of Commons on May

10 what supervision was being exercised over steel firms not yet returned to the control of private shareholders.

Mr. Duncan Sandys (Minister of Supply) replied that supervision over all steel companies, irrespective of the ownership of their shares, was exercised by the Iron & Steel Board.

Mrs. White asked whether the Minister was himself satisfied that firms should really be considerably removed from effective control while they were in the hands of an Agency, concerned purely with their financial affairs.

Mr. Sandys said that all companies, whether private or publicly owned, were controlled by their respective boards of directors, who were answerable to the shareholders. The Iron & Steel Holding and Realisation Agency, which held the shares of companies which had not yet been returned to private ownership, exercised at least as much control as any body of private shareholders.

Mr. Gerald Nabarro (Kidderminster—C.) drew attention to the present level of steel production and the record output of 18,000,000 tons in a full year. In those circumstances, he asked why it was necessary to have any control other than the supervision of the Iron & Steel Board.

Mr. Sandys said he thought Mr. Nabarro had provided the answer.

Driver-Guard Communication on Trains

Mr. Hector Hughes (Aberdeen N.—Lab.) asked in the House of Commons on May 12 whether the Minister of Transport and Civil Aviation was aware that on British Railways there was no means by which the guard of a train could communicate with the engine driver of the same train without stopping the train; that was likely to lead to accidents; and if he would give a general direction to the British Transport Commission that such means of communications were to be provided.

Mr. Hugh Molson (Joint Parliamentary Secretary to the Ministry of Transport and Civil Aviation) replied: Although the only means by which the guard can attract the driver's attention is by applying the continuous brake, experience has not shown that anything further is required in the interests of safety.

Mr. Hughes said this was likely to cause accidents, especially in the north of Scotland, where people who opened and closed the gates at level crossings had been dismissed; and, as a result the engine fireman at each level crossing had to get down four times in order to allow the train to pass the level crossing and open and close the gates. That was all due to the absence of the people who used to open the gates at level crossings, because there was no communication between the driver and the guard of the train.

Mr. Molson said he did not follow how this predicament in the north of Scotland had any bearing on the question of communication between the driver and the guard. He was not aware that any accident had happened in this way.

British Railway Superannuitants

Mr. Ralph Morley (Southampton, Itchen—Lab.) on May 12 inquired if the Minister of Transport & Civil Aviation had considered the telegram from the Railway Superannuitants Conference at Rhyl calling for a square deal for British Railway superannuitants; and what action he proposed to take.

Mr. Alan Lennox-Boyd (Minister of Transport & Civil Aviation) stated in reply: A year ago the B.T.C. introduced a scheme of pension supplements to help the

worst cases. As I explained on March 1 of last year, I must have regard to the Commission's statutory duty to make ends meet, and I should not be justified in trying to influence their judgment.

Mr. Morley said that during that debate the Minister stated that the increases would be given to over 6,000 superannuitants, and only 2,820 superannuitants had actually received the increase because the ceiling was so low. He asked the Minister to look at the matter again.

Mr. Lennox-Boyd said he was very glad to be able to announce to the House the actual action by him in this field, so long neglected. He would certainly look into the figures given by Mr. Morley. The Commission must have regard to fair arrangements both with their employees as to pensions and with their customers as to fares and freights.

Staff & Labour Matters

Increase for Senior Railway Staff

The B.T.C. has made an Agreement with the British Transport Officers' Guild and the Transport Salaried Staffs' Association as a result of which annual increases ranging from £45 to £65 have been granted with effect from February 1, 1954, to senior salaried staff on British Railways with salaries above Special Class Category "C" and not exceeding £1,750 a year.

WICKMAN LIMITED: APPOINTMENT OF REPRESENTATIVES.—Wickman Limited announce the appointment of Mr. G. C. Bateman as direct factory representative for Lidkopings Mekaniska Verkstads Aktiebolag, Lidköping, Sweden, and Ulvsunda Verkstads Aktiebolag, Ulvsunda, Stockholm, in the United Kingdom and other countries. Mr. Bateman, who is a grinding machine specialist, is at present in the U.S.A. on behalf of Messrs. Lidkopings & Ulvsunda, and when operating in the United Kingdom will be located at Wickman Limited, Factored Machine Tool Division, Fletchamstead Highway, Coventry. Wickman Limited have appointed Mr. B. Heaven as their own sales specialist for Lidköping centreless grinding machines, and so on, and U.V.A. Internal grinding machines for their exclusive territory of the United Kingdom.

ANOTHER FRENCH RAILWAYS RECORD.—In March of this year the French Railways electric locomotive No. 2-D-2 9101, running between Paris and Lyon, set up a new world record distance of 32,098 miles covered in one month in ordinary service. This is equivalent to covering the distance between Paris and Budapest on every day of the month. No special preparations were made for this performance. The previous holder of the record was also a French electric locomotive, No. 2-D-2 5547, running between Paris and Hendaye on the South-Western Region of the French Railways, which in July of last year covered a total of 31,357 miles. The 2-D-2 9101 was the first of a new class of electric locomotives built for service on the recently electrified line between Paris and Lyon, and came into service in February, 1950. Since that date it has covered a total of 534,380 miles. Locomotives of this type are regularly called upon to haul heavy passenger trains of 850 tons over the 318 miles between Paris and Lyon at an average speed varying from 68 to 71 m.p.h. They are frequently used to haul the "Mistral" rapide train, which holds the world record of over 76 m.p.h. for an average speed over that distance.

Contracts & Tenders

British Railways, North Eastern Region, have placed the undermentioned contracts:

George Cohen Sons & Co. Ltd.: one Jones K.L.22 two-ton mobile crane for Greetland Permanent Way Depot

Allen McDermott, Bradford: cleaning and painting, Huddersfield new goods warehouse

British Railways, Eastern Region, announce that the undermentioned contracts have been placed:—

Brightside Foundry & Engineering Co. Ltd., Manchester, 3: installation of modern system of steam heating at Gorton Carriage & Wagon Works

Tersons Limited, Finchley: renewal of drainage and rebalasting of permanent way between Ingatstone and Chelmsford; provision of up goods loop between Purfleet Rifle Range and Rainham; and provision of down goods loop between West Thurrock Junction and Grays

W. & C. French Limited, Buckhurst Hill: construction of awning, reconstruction of egg bank and strengthening of existing arches for returned empties working at Spitalfields Goods Depot

British Railways, Southern Region, have placed the undermentioned contracts:—

The Limmer & Trinidad Lake Asphalt Co. Ltd., Parkstone, Dorset: asphalt pavings at Bournemouth Central and renewal of asphalt roofs at Waterloo

Arthur Scull & Son Ltd., London, W.C.2: heating and hot water installation at Wimbledon Park Carriage & Wagon Depot and installation of central heating at Battersea Park Road Motor Workshops

G. H. Haden & Sons Ltd., Eastbourne: installation of hot water heating at Lewes Junction main signalbox

E. Proctor & Sons, Plumstead: alterations, repairs, and renovations at Orpington Station Maurice Hill Limited, Havant, Hants: reconstruction of engine shed roofs at Salisbury Matthew T. Shaw & Co. Ltd., London, E.14: supply and assembly of steelwork for restoration of Esher Station road bridge

T. W. Palmer & Co. (Merton Abbey) Ltd., London, S.W.19: steelwork for colour light signal structures

W. & J. Glossop Ltd., Exeter: resurfacing and surface dressing of roads, paths, and platforms in Exeter District

Girling's Ferro-Concrete Co. Ltd., Feltham: supply of artificial stone units, for electrical substations, and so on

Industrial Engineering Limited: waterproofing of roofs at Norwood Junction Permanent Way Depot and at Rotherhithe Road Repair Shops.

Clyde Industries Limited, of Sydney, N.S.W., has received from the Victorian Railways an order for 25 diesel-electric locomotives of 800 h.p. for light line service on the 5-ft. 3-in. gauge system.

Ardeltwerke G.m.b.H., of Wilhelms-haven, Germany, has received from the Egyptian State Railways an order for two diesel-powered 60-ton railway breakdown cranes for standard gauge tracks.

Ferrostaal A.G., of Essen, has received from the Portuguese colonial authorities an order for 30 low-sided gondola cars, 30 high-sided wagons, 16 cattle trucks, one mobile workshop and a quantity of rails and permanent-way equipment for the Mossamedes Railway.

Linke-Hofmann-Busch G.m.b.H. has received an order from the Chilean State Railways for three four-car multiple-unit

3,000-V. d.c. electric trains of 5-ft. 3-in. gauge. The bodies for the two centre trailer cars in each set are being made by the Maschinenfabrik, Esslingen, and the electrical equipment is being made by Siemens-Schuckertwerke.

The Soc. p.A. Badoni, of Lecco, has received orders totalling 25 diesel-hydraulic and diesel-mechanical shunting locomotives of 200 and 150 h.p. from the Italian State Railways.

The Director General of Supplies & Disposals, New Delhi, is inviting tenders for:—

(EA1/BG/2322 (Ex. EI), IL/BG-603(NR)). 740 brake block shoes, "AWD" "CWD" class engines, to I.R. drawing No. L/BH-603: Alt. Nil to I.R.S.S. No. M.31/49 Grade 10

Tenders are to be submitted to the Director General of Industries & Supplies, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/16298—E/11 and will be received up to 10 a.m. on June 9.

If the date for the receipt of tenders does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotation to India in their own letter form or by telegram so long as all essential particulars are given and provided they simultaneously apply for the tender forms and return them duly completed as quickly as possible on the basis of advance quotations already submitted.

A copy of the tender form can be examined at the India Store Department, 32-44, Edgware Road, London, W.2, on application to the "CDN" branch and drawings can be seen at the offices of Hodges Bennett & Company, 59/60, Petty France, London, S.W.1, from whom copies may be obtained if required at a fixed price per sheet.

The Director General of Supplies & Disposals, New Delhi, is inviting tenders for:—

450 draw hooks dead soft steel or class I steel to M.S.M. drawing No. 583/B.G. "Y" Mod. Fig. 2 (D.G.I. & S.) No. 2897 & I.R.S. specification M.3/49 class I.

Tenders are to be submitted to the Director General of Industries & Supplies, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/16113-E/III and will be received up to 10 a.m. on May 27.

If the date for the receipt of tenders does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotation to India in their own letter form or by telegram so long as all essential particulars are given and provided they simultaneously apply for the tender forms and return them duly completed as quickly as possible on the basis of advance quotations already submitted.

A copy of the tender form can be examined at the India Stores Department, 32-44, Edgware Road, London, W.2, on application to the "CDN" branch and drawings can be seen at the offices of Hodges Bennett & Company, 59-60 Petty France, London, S.W.1, from whom copies may be obtained if required at a fixed price per sheet.

The Director General of Supplies & Disposals, New Delhi, is inviting tenders for:—

1,250 plungers buffer long (B.G.) with spindle and plug to I.R.S. drawing No. W-358, alt. 15 and to I.R.S.S. M.2/48 class "A" grade 2, W-353 alt. 14 and to I.R.S.S. M.4/49

and W-374 alt. 17 and to I.R.S.S. M.3/49 or M.5/48 respectively. All parts to be assembled.

Tenders are to be submitted to the Director General of Industries & Supplies, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/17277-D/III and will be received up to 10 a.m. on May 28.

If the date for the receipt of tenders does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotation to India in their own letter form or by telegram so long as all essential particulars are given and provided they simultaneously apply for the tender forms and return them duly completed as quickly as possible on the basis of advance quotations already submitted.

A copy of the tender form can be examined at the India Store Department, 32-44, Edgware Road, London, W.2, on application to the "CDN" branch and drawings can be seen at the offices of Hodges Bennett & Company, 59-60 Petty France, London, S.W.1, from whom copies may be obtained if required at a fixed price per sheet.

The Director General of Supplies & Disposals, New Delhi, is inviting tenders for:—

3,948 brake hangers trimmer steel class II to I.R.S.S. No. M.5/54 to O.T.R. drawing No. W.C.359 (D.G.S. & D. No. 9465)

987 brake shafts steel class II to I.R.S.S. No. M.5/54 to O.T.R. drawing No. W.C.360 (D.G.S. & D. No. 9466)

987 hand brake levers steel class II to I.R.S. specification No. M.5/54 to O.T.R. drawing No. W.C.358 (D.G.S. & D. No. 9464)

987 pull rods 7 ft. 10½ in. long steel class II to I.R.S. specification No. M.5/54 I.R.C.A. drawing No. M./13/1 alt. I Fig. D.

Tenders are to be submitted to the Director General of Industries & Supplies, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/16324-E/II and will be received up to 10 a.m. on May 27.

If the date for the receipt of tenders does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotation to India in their own letter form or by telegram so long as all essential particulars are given and provided they simultaneously apply for the tender forms and return them duly completed as quickly as possible on the basis of advance quotations already submitted.

A copy of the tender form can be examined at the India Store Department, 32-34, Edgware Road, London, W.2, on application to the "CDN" branch and drawings can be seen at the offices of Hodges Bennett & Company, 59-60 Petty France, London, S.W.1, from whom copies may be obtained if required at a fixed price per sheet.

The Director-General of Supplies & Disposals, New Delhi, is inviting tenders for:—

3 drawbars with nuts, Goodall type for "YB," "YF" class locomotives to Ex. B. & A.R. drawing No. 2 P. 40 (D.G.I. & S. No. 4757) and specification as shown on the drawing

Tenders are to be submitted to the Director-General of Industries & Supplies, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/16262-E/III and will be received up to 10 a.m. on June 12.

If the date for the receipt of tenders does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotation to India in their own letter form or by telegram so long as all essential particulars are given and

provided they simultaneously apply for the tender forms and return them duly completed as quickly as possible on the basis of advance quotations already submitted.

A copy of the tender form can be examined at the India Stores Department, 32-44, Edgware Road, London, W.2, on applications to the "CDN" branch and drawings can be seen at the offices of Hodges Bennett & Company, 59/60, Petty France, London, S.W.1, from whom copies may be obtained if required at a fixed price per sheet.

Notes and News

Technical Assistant Required.—Applications are invited for the post of technical assistant required for railway civil engineer's office at Kings Cross. Applicants should have had experience in steel and reinforced concrete design and detailing, including taking off quantities. See Official Notices on page 591.

Tube Investments Limited Interim Dividend.—The board of Tube Investments Limited has declared a dividend at the authorised rate on the 7 per cent cumulative first preference stock and on the 4½ per cent redeemable cumulative preference stock for the half year ending May 31. An interim dividend of 7½ per cent is also announced on the ordinary stock on account of the year ending July 31. These dividends are payable to members on the registers on April 24 and warrants will be posted on May 31.

Sir Brian Robertson's Visit to the North-east.—The Chairman of the British Transport Commission, Sir Brian Robertson, visited railway, dock, road haulage and road passenger undertakings in the north-east on May 10, 11 and 12. He met members of the staff and trading interests and saw several major developments now taking place in industry. The accompanying illustration shows Sir Brian Robertson being asked by Apprentice Plumber Dodd to accept an inscribed folding carriage key in a leather case to commemorate his first visit to the Apprentices Training School at North Road Locomotive Works, Darlington.



Presentation to Sir Brian Robertson at the Apprentices Training School Darlington (see paragraph above)

ton. With him is Mr. K. J. Cook, Mechanical & Electrical Engineer, British Railways, Eastern and North Eastern Regions.

Hoffman Manufacturing Co. Ltd.—The annual meeting of the Hoffman Manufacturing Co. Ltd. was held recently in London. The Chairman, Mr. J. W. Garton, presided. In his statement, circulated with the accounts for 1953, he stated that the order book had continued to contract during the year. The company's productivity had been maintained at a reasonable level and with economies, reorganised layouts, and improved methods, the results for the year were fairly successful.

New Steel-lined Plastic Tube.—George Burn Limited, Smethwick, specialists in the manufacture of tubes and conduits, has recently developed a new range of tube which is claimed to combine the durable qualities of plastics with the rigidity of steel. The new product, known as Burcol tubing, consists of normal steel tube covered with a skin of P.V.C. material. The adhesion of the P.V.C. to the steel is effected by a new process developed by the firm. With resistance to corrosion, the material has potential applications over a wide range of industries. Cold handling presents no difficulty when the P.V.C. is processed on to welded steel tubing. Burcol is produced in four standard colours, off-white, black, red, and apple green; shade or colour can be produced to special requirements. Six standard sizes are available from ½ in. to 1½ in. outside dia.

Western Region Summer Train Service.—British Railways, Western Region, point out that the down "Torbay Express" is scheduled in the summer timetable to pass the 11.30 a.m. Paddington to Plymouth at Taunton, and not, as stated on page 512 of our May 7 issue, between Taunton and Exeter. The 10.10 a.m. Paddington to Aberystwyth provides a 2-hr. service to and not from, Birmingham. The 2.10 p.m. from Paddington was accelerated to arrive Birmingham at 4.26 p.m. in the present winter service, and is not accelerated as suggested. The 7.55 a.m. Penzance to Swansea runs on Mondays to Fridays only, and calls also at Brent and Totnes; the return train from Swansea at 11.10 a.m. also runs on Mondays to Fridays only. The 1.10 p.m. (Sundays) Paddington to Wolverhampton calls at High Wycombe to pick up passengers only. The 6 p.m. Paddington to Gobowen is a relief to the 6.10 p.m., not 6.30 p.m., from Paddington. In the reverse direction a train leaves Birkenhead at 11.45 a.m., not 11.35 a.m. The 6.55 p.m. Birmingham to Paddington train via Oxford starts from Wolverhampton at 6.25 p.m.

D.P. Battery Co. Ltd., at the Mechanical Handling Exhibition.—Kathode cells, specially designed for every type of battery-operated mechanical handling equipment, will be the main feature on the stand of the D.P. Battery Co. Ltd. at the Mechanical Handling Exhibition at Olympia, London, next month. One of many recent technical developments has been the introduction of Porvic ribbed separators, an advance of importance in the traction battery field. A further special feature of Kathode cells is the provision of special insulating rods which fill the spaces between the separators at the edges of each negative plate. This, it is stated, has entirely obviated the risk of short circuits arising from the formation of spongy growth. The Kathode

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

THE "PAGET" LOCOMOTIVE. Hitherto unpublished details of Sir Cecil Paget's heroic experiments. Eight single-acting cylinders with rotary valves. An application of the principles of the Williams central-valve engine to the steam locomotive. By James Clayton, M.B.E., M.I.Mech.E. Reprinted from *The Railway Gazette*, November 2, 1945. Price 2s. Post free 2s. 3d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

TECHNICAL ASSISTANT required for Railway Civil Engineer's Office at Kings Cross. Applicants should have had experience in steel and reinforced concrete design and detailing, including taking off quantities. Knowledge of permanent way an advantage. Salary range £649/£729. Free residential rail travel within certain limits on entry and further free and reduced rate travel facilities after qualifying period of service. Five day week. Canteen facilities. Possibility of permanency after qualifying period of service. Apply in writing giving full particulars as to age, education, training and experience, previous positions held and any special qualifications possessed, to Civil Engineer, British Railways, Eastern Region, Kings Cross Station, London, N.1.

INTERNATIONAL RAILWAY ASSOCIATIONS. Notes on the work of the various associations concerned with International traffic, principally on the European Continent. 2s. By post 2s. 2d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

THE HIGH COMMISSIONER FOR INDIA invites tenders for the supply of rough cast steel items as follows: 70 Cylinder Cover Hind R.H. 70 Cylinder Cover Hind L.H. 140 Cover Steam Chest Hind. Forms of tender may be obtained from the Director-General, India Store Department, 32/44 Edgware Road, London, W.2, on or after May 21, 1954, at a fee of 10s. which is not returnable. Cheques to be made payable to "High Commissioner for India." Tenders are to be delivered by 2 p.m. on Friday, July 2, 1954. Please quote reference No. 393/53/1.

FOR SALE 550 tons approximately, good relayable original weight 95 lb. F.B. Rail with fishplates to suit. Apply Box 211, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25s. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press, Limited, 33, Tothill Street, London, S.W.1.

method of construction is also employed in D.P. batteries for marine applications and in the special range produced for diesel-engine starting. Examples of both types will be shown, together with a group of D.P. stationary cells for emergency lighting, switch-tripping and closing, and many other duties in industry.

Locomotive Manufacturers' Association Dinner to Congress Delegates.—The Locomotive Manufacturers' Association of Great Britain is giving a dinner tonight (Friday) at the Savoy Hotel, London, W.C.2, in honour of delegates to the Sixteenth Session of the International Railway Congress. The speakers will include Mr. Alan Lennox-Boyd, Minister of Transport, Mr. John Alcock, President of the Locomotive Manufacturers' Association, and Monsieur M. de Vos, President of the International Railway Congress Association.

Tudor Traction Cells at the Mechanical Handling Exhibition.—Batteries of traction cells constructed to the most advanced design, and suitable for all types of electrically-driven industrial truck and handling appliances, will be displayed by the Tudor Accumulator Co. Ltd. at the forthcoming

Mechanical Handling Exhibition. They will be shown with a battery of Tudor cells for marine applications and a complete Safetylyte emergency lighting plant of the type widely used in factories, warehouses, workshops and so on, to provide a lighting supply during power cuts and mains failure. A range of typical Tudor stationary cells suitable for telephones, fire alarms and signalling equipment will complete the exhibit. Tudor traction batteries are now fitted with the new Porvic microporous plastic separators. It is said that this new material improves plate separation to the point where the failures experienced with other forms of assembly are practically eliminated.

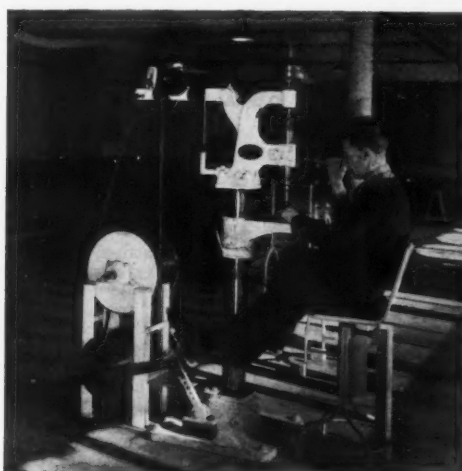
Opening of London Fare Increase Inquiry.—The hearing of the application of the British Transport Commission to increase fares on London Transport road and rail services and on the London suburban lines of British Railways opened in London on May 18. Nineteen organisations, many of which have briefed counsel, have lodged objections to the proposals. Mr. Hubert Hull, President of the Transport Tribunal, is hearing the application, with the two other permanent members. One of the objectors is the London County Council.

Mr. Hubert Hull said that the Tribunal proposed to sit on May 19, 20, and 21, and also from Tuesday to Friday next week.

Western Region Unofficial Strike.—An unofficial strike directed against the introduction of new lodging turns at Newton Abbot earlier this week was affecting the Western Region motive power depots at Old Oak Common, Bristol, and Newton Abbot, where many footplate staff failed to report for duty. The strike commenced at Newton Abbot at midnight last Sunday. The Western Region ran as many trains as possible in the circumstances, and achieved a good deal of success in minimising inconvenience to the public. As we went to press it was reported that enginemasters at Taunton had decided to take no part in the strike, but the Banbury branch of the Associated Society of Locomotive Engineers & Firemen was to consider strike action at a meeting to be held on May 19.

New Vessel for Associated Humber Lines.—The first of two motor vessels being built by Hall, Russell & Co. Ltd., for the British Transport Commission and to be operated by Associated Humber Lines was launched at Aberdeen on April 30. The ship was

New Developments at Swindon



(Left) Sir John Benstead opening the new cafeteria at Swindon Junction on May 10, with Lady Benstead and Mr. K. W. C. Grand; (right) drilling machine adapted for therapeutic work in the rehabilitation workshop at Swindon Works opened the same day by Lady Benstead (see our issue of May 14)

named *Whitby Abbey* by Mrs. H. W. R. Ogram, wife of the General Manager of Associated Humber Lines. A sister ship, to be named *Fountains Abbey* will be launched in about a month's time. The *Whitby Abbey* is of modern appearance with raked stem and cruiser stern, and will be 256 ft. overall with a moulded breadth of 38 ft. 6 in. and depth, to shelter deck, of 21 ft. The deadweight tonnage is 1,100 tons and the hold capacity is 78,000 cub. ft. The vessel will be powered by a six-cylinder Kincaid-Polar M 56 T. diesel engine, designed to develop 2,100 b.h.p. at 220 r.p.m. Speed will be 13 knots at 90 per cent of the rated power.

L.M.A. Underground Mines Locomotive Division Cocktail Party.—The members of the Underground Mines Division of the Locomotive Manufacturers' Association will give a cocktail party at the Palace Hotel, Buxton, on June 2, to delegates to the National Association of Colliery Managers' conference.

British Timken Limited Dividend.—An ordinary dividend of 8 per cent for 1953 is announced by British Timken Limited. This is on capital increased by a 66½ per cent scrip issue and compares with 10 per cent on the former capital in 1952. Group net profits were £540,595 (£504,274) after taxation amounting to £601,177 (£718,432). The holding company's net profits were £458,415 (£438,603). £353,091 (£358,979) were placed to general reserve and £166,703 (£171,379) carried forward.

Head, Wrightson & Co. Ltd.—A final ordinary dividend of 20 per cent is recommended by the board of Head, Wrightson & Co. Ltd. This makes a total dividend of 25 per cent for the year ended January 31 last compared with 17½ per cent for the previous nine months. This absorbs £81,211 (£56,109). The parent company had a trading profit of £528,895 (£299,102 for nine months) on completed work, and subsidiaries a profit of £358,463 (£359,607 for the previous year). To the total of £887,358 is added interest and dividend received of £25,111 (£20,172). Depreciation took £107,260 (£79,887), pensions £25,000 (nil), and tax £412,451 (£343,317), leaving group net profits of £367,758. (This compares with £255,677, to which sundry credits from taxation adjustments were added amounting to £143,132.)

Ardleigh Engineering Limited.—A new company, to be known as Ardleigh Engineering Limited, has been formed to provide engine speed governors and other control equipment for engine builders. The governors at present offered, for diesel engines in the 100-3,000 h.p. range, are suitable, among other purposes, for diesel rail traction. Type 300 GL is designed specifically for this purpose and incorporates a hydraulic load control valve limiting the demand of the traction generator, so that full engine power can be used over a wide range of locomotive speed. The valve responds both to engine speed and load, and is adjustable to allow the relative effects to be varied. It is also fitted with an electrically operated remote speed-setting control mechanism giving eight different engine speeds, and a remotely controlled shut-down valve, operated by a solenoid, is provided. All of the four main types of governor supplied are offered for constant or variable speed engines, and they operate on the conventional flyweight principle with hydraulic operation of the engine fuel control and speed setting lever.

Forthcoming Meetings

May 22 (Sat.).—Permanent Way Institution, Leeds & Bradford Section, at 2.30 p.m. Afternoon visit to the North Eastern Gas Board, West Yorkshire Gas Grid, Teagley, near Wakefield.

May 26 (Wed.) to May 29 (Sat.).—British Railways & London Transport Exhibition of latest developments of railway locomotives, rolling stock, and engineering equipment at Willesden Motive Power Depot. Wednesday 3 to 7 p.m. Thursday to Saturday inclusive, 10 a.m. to 7 p.m.

May 26 (Wed.).—Railway Students' Association, at the London School of Economics & Political Science, Houghton Street, London, W.C.2, at 6.15 p.m. Annual general meeting.

May 27 (Thu.).—Institute of Metals, at 4, Grosvenor Gardens, London, S.W.1, at 5.30 p.m. Lecture entitled "Lattice defects and energy stored in deformed metals," by Dr. W. Ross.

May 28 (Fri.) to May 30 (Sun.).—Institution of Railway Signal Engineers' Summer meeting at Utrecht, by invitation of the General Manager, Netherlands Railways.

May 28 (Fri.) to June 7 (Mon.).—British Railways, Southern Region, Lecture & Debating Society. Continental tour.

May 29 (Sat.).—Royal Engineers' Association, London Group. Second London sapper reunion, at the Duke of York's Headquarters, Chelsea, S.W.3, from 7 to 11 p.m.

May 31 (Mon.).—Indian State Railways. At the Rembrandt Hotel, South Kensington, S.W.7, at 7 for 7.30 p.m. Annual dinner.

June 9 (Wed.) to June 19 (Sat.).—Mechanical Handling Exhibition, at Olympia, London.

Until September 25 (Sat.).—"Popular Carriage" Exhibition (Two centuries of carriage design for road and rail) in the Shareholders' Meeting Room, Euston Station, London, N.W.1. Weekdays 10 a.m. to 7 p.m.; Sundays 2 to 7 p.m.

Railway Stock Market

There have been conflicting factors in stock markets, but generally the volume of business was substantial, and after their earlier reaction this week, the lower prices in the gilt-edged and industrial sections attracted renewed buying. Last week's reduction in the bank rate to 3 per cent, did not come as a surprise, but despite their sharp rise in recent weeks on lower bank rate prospects, British Funds went higher again. This week, however, British Funds and many industrial shares encountered some profit taking. Sentiment tended to be affected by international uncertainties and by a tendency to await further developments in Indo-China and at the Geneva conference. The prevailing view is that it will not be long before there is a renewed rise in markets, though much may depend on the trend in international affairs.

In recent months there has been little selling, with the result that markets are none too well supplied with stock. Consequently, prices are likely to go strongly ahead again when buyers predominate. It is expected that the lower bank rate will speed up new issues. Over the next few weeks a number of colonial and corporation loans are expected to make their appearance, and some important industrial issues are also being predicted. It seems therefore, that existing securities will have a good deal of competition from new issues.

Foreign rails attracted only moderate attention. Antofagasta preference stock has been in demand and rose to 41½, buyers being attracted by the good yield and by the hope that payment of the outstanding arrears of dividend may be speeded up or a funding scheme proposed to deal with the arrears. The latter is, however, not generally expected; but it seems that a good case can be made out for the view that the preference stock is moderately priced in the market. Antofagasta ordinary stock has remained around 8½, and the 4 per cent debentures were dealt in up to 44.

Steadiness was shown by Manila Railway stocks, awaiting the further statement expected from the directors which may give information as to break-up values of the stocks. The "A" and "B" debentures have transferred around 141 and 134½ respectively, while the preference shares were

18s. 10½d. and the ordinary shares 8s. 7½d. In other directions, United of Havana second income stock remained at 43 and the consolidated stock at 64.

Canadian Pacifics eased to \$43 with the preference and ordinary stocks at £66 and £91½ respectively. White Pass no par value shares receded to \$24 and the convertible debentures to £87½.

Mexican Central "A" debentures were dealt in around 74, San Paulo units were 3s., Nitrate Rails shares 21s. 3d. and Taltal Railway shares marked 13s. 9d. Brazil Railway bonds were again higher at 8.

After their recent rise, Dorada Railway ordinary stock came in for profit taking and changed hands down to 73½. Chilean Northern first debentures have shown dealings ranging from 25½ to 27, while Guayaquil & Quito first bonds changed hands up to 51½.

Among Australian stocks, Midland of Western Australia was dealt in around 20 and the second debentures at 40. Emu Bay 4½ per cent debentures marked 64.

Nyasaland Railways 3½ per cent debentures were 79½; and among Indian stocks, Barsi were again around 122.

Road transport shares showed firmness with West Riding at 34s. 3d., Lancashire Transport 51s. and Southdown 32s.

There have been small irregular movements in engineering shares, though a few good features developed, notably T. W. Ward, which have advanced to 99s., while Thornycroft moved up to 39s. 6d. Guest Keen were higher at 58s. 9d. on the reacquisition by the company of the larger part of its former steel interests, which it is assumed will not mean an increase of capital. Vickers were steady around 57s. 6d. in front of the annual meeting. Babcock & Wilcox eased to 55s. 3d. and Cammell Laird 5s. units to 13s. 7½d. Tube investments at 65s. 3d. lost part of an earlier rise. John Brown were 39s. 6d. and Associated Electrical 50s. 3d.

Among shares of locomotive builders and engineers, Beyer Peacock were 39s., Birmingham Carriage 27s. 4½d., Hurst Nelson 42s. and North British Locomotive 15s. 9d. Vulcan Foundry strengthened to 24s., Gloucester Wagon 10s. shares were 17s., Charles Roberts 5s. shares 9s. 3d. and Wagon Repairs 5s. shares 13s. 3d.